AMATEUR RADIO

MAY 1964

Vol. 32, No. 5

2/-

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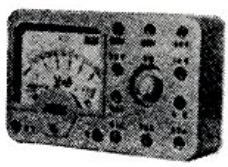

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25	6	3/3	* Disposal type		

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OUR COVER

This month the cover illustration shows an almost full scale photo of a night spider. This has been chosen because it provides a direct comparison with the actual sizes currently being used for many electronic components or parts. In fact, modern electronics today uses parts which are far finer than the spider's web shown on our cover. Many transistors use tolerances which make the thickness of a web seem coarse.

FEDERAL COMMENT

★

HOW TO KILL OR BUILD AN ORGANISATION

When conditions on the Amateur bands are bad or there is a sunspot minima as we have at present, Institute activity generally seems to decline. It is at these times when one hears complaints, rumours and other wild mutterings. It is a case of "idle hands get into mischief". This state of affairs is common with all organisations, and at some stage or other when a general stasis applies a glorious lassitude pervades the membership in their attitude towards their club or organisation.

It is similar with the W.I.A. and it is now that the members should be wary—they should be bestirring themselves to create interest and not kill it. The quickest way to "kill" any rehabilitation process is to adhere to the following ten rules (with apologies to the U.S. Magazine Popular Gardening):

1. Don't come to meetings, but if you do, come late.
2. Find fault with the officers and other members; particularly on the air.
3. Never accept office; it is easier to critise than to do things.
4. Nevertheless, get annoyed if you aren't appointed to a committee.
5. If appointed, don't attend the committee meetings.
6. When asked to express your opinion, say nothing but afterwards tell everyone how things should be done.
7. When others roll up their sleeves to help, say the Institute is run by a clique.
8. Never write a magazine article; it's too much of a bore.
9. Hold back on your dues as long as possible, or don't pay at all.
10. Don't bother about getting new members, but if you do, be sure they are moaners like yourself.

Fortunately, we believe there are very few Organisation Killers amongst us, but in times of inactivity, beware. The Organisation Killer is an insidious disease and can become epidemic.

We would like to believe that every member of the Institute was the direct antithesis of the OK, and it does not really take any great effort to become so. Beware of that feeling of complacency that advises there are plenty of others to do the work. There is always some job in the Division you can do, and to quote the old proverb—Many hands make light work. Too often too much is left to too few.

So we suggest that you offer your assistance to your Divisional Council and you will find them only too willing to accommodate you in some way; don't be shy about coming forward to help when assistance is required—you may find you may hold an important office yourself in the near future; become a real Organisation Builder and not a Killer.

FEDERAL EXECUTIVE, W.I.A.

CONTENTS

THE "TETRA-LINEAR"

A "Passive-Grid" Linear Amp. using four EL38s in Parallel (tamed)

PHIL WILLIAMS, VK5NN*

THE exciter at VK5NN uses a 6146 with about 80-100 watts peak input which has done very well "DX-wise" during the past six years, but with deterioration of the h.f. bands, it was found to be struggling. So designs were started for a linear which would meet the following specifications:

- It would need to fit into the remaining 8" width of shelf space beside the exciter and AR88 receiver, so 18" of depth and 10½" of height were available.
- There should be no very high voltages employed and a readily available and replaceable transformer used.
- There should be no large tungsten filaments and the associated heat dissipated in the shack.
- Silicon diodes should be used with the same object in view.
- The power supply should be within the amplifier case.
- Small transmitting tubes or large t.v. line-time base tubes should be used to keep initial and replacement costs down.
- A 70 ohm nominal output impedance pi-network should be employed with universal matching on all bands from 10 to 160 mx.
- There should be no input tuned circuits.
- It should not be necessary to use large transmitting components.
- The need for neutralisation should be avoided.

The above ruled out the use of 813s, 805s, 866s and the like, high voltage transformers and h.v. block condensers.

Surveying the literature, the Globe LA-1 Linear, described in Stoner's New Sideband Handbook, using four EL38 line-time base tubes at 25/- each caught the eye and appeared to fit into the space available. A standard 17" x 8" chassis was purchased and 8" x 10½" trays fitted to make front and rear panels, with ¾" aluminium angle on the top side corners to stiffen the assembly. The top cover (top and two sides) of perforated metal is bent to fit over the angle and fixed to the sides of the chassis with three screws on each side.

The amplifier was first wired as a grounded grid device but otherwise in accordance with the circuit and layout shown. It worked, but loading of the exciter was unsatisfactory because of the change of loading with drive level, as well as some instability when exciter and output pi-networks were not tuned in accordance with settings which were marked after much experiment.

* 37 Winns Road, Blackwood, South Australia.

It was then realised why these LA-1 linears are so cheap on the U.S. second-hand market, but in an attempt to "save the day," it was decided to re-wire the tubes for passive-grid operation, i.e. with 210 volts on the screen grids, fixed grid bias, and 75 ohms of carbon resistor at the grids.

These changes proved so beneficial that the amplifier has remained in this condition and performed with complete stability ever since. The 75 ohm 10w. grid resistor loads the exciter perfectly at all times whether the linear is switched on or off, and no grid or cathode tuned circuits or pi or L networks are required, with their attendant handswitching complications.

Visitors' comments and many queries over the air have prompted this write-up for "Amateur Radio". Several similar amplifiers have been built using the same EL38s, another with 807s, and yet another variation with the single-ended KT66s, all of which work so well that this general design appears to be universally adaptable. The KT66 version is known affectionately as the "Humpty-Dumpty" linear as the four tubes are sitting up on a vertical partition 1½" high, with grids one side and anodes the other.

DESIGN OF THE AMPLIFIER

The EL38 characteristic curves under conditions given for G1 and G2 voltages give a peak anode current of about 375 milliamps. at the knee of the curve at 0 grid volts.

The load line drawn on the curves indicates an R_L of 6,000 ohms, so that the pi-network for an amplifier using four of these valves in parallel should be designed for R_L = 1,500 ohms with Q = 12. Where the output capacitance is irreduceable on 10 metres the Q is allowed to rise to 15, and where the plate tuning capacitor's maximum value is inadequate on 160, metres, the Q is allowed to be lower, with little degradation in quality.

Band	Total Capacity	Inductance	Loading Capacitor	Q
160	380 pF.	32.0 μH.	2000 pF.	8
80	280 ,,	8.5 ,,	1300 ,,	10
40	180 ,,	3.2 ,,	750 ,,	12
20	90 ,,	1.6 ,,	370 ,,	12
15	60 ,,	1.08 ,,	250 ,,	12
10	45 ,,	0.8 ,,	185 ,,	15

Table 1.—Pi-Network Data.

With correct loading the amplifier will allow the plate current to rise to a peak **instantaneous** value of 1,500 milliamps., so that a peak input of about 500 watts is possible in an amplifier with a total plate dissipation rating of 80-100 watts, and using a plate transformer rated at 80 watts (h.t. winding only), viz. 400v. at 200 mA.

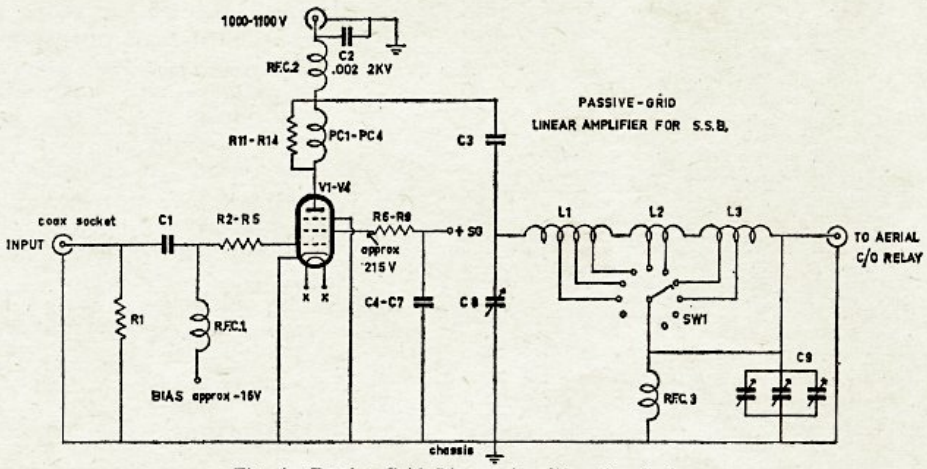


Fig. 1.—Passive-Grid Linear Amplifier for S.s.b.

In order to keep the amplifier from being overloaded thermally, the meter readings kick-up to about 150 mA. on speech, at which current, the peaks may be 1400 or 1500 mA. of total cathode emission. It is surprising to notice that at such values the plates show no colour, and the transformer does not become overheated. The amplifier should **never** be run at full input, indeed it cannot, as the power supply regulation will not permit it, the plates will colour-up to give you warning, and something will go "phut!" or melt.

Thus our objective of designing a linear amplifier for s.s.b. speech, which would take about 150 watts. average input on peaky male speech with about a 25% duty cycle, without flattening, and without overheating, has been achieved.

The circuit diagram shows the method of obtaining and regulating the voltages. It will be noted that capacitors—large electrolytics—are considered the cheapest and best method of achieving the dynamic regulation necessary. Static regulation is rather unimportant. "On the air" tests and reports have given a clean "bill of health".

In order to reduce intermodulation distortion at low levels, the plate current is set at 60-80 mA., i.e. 15-20 mA. per tube, in the quiescent condition. This is not switched off when not transmitting as the amount of heat liberated is no more than from a soldering iron.

The power supply uses twelve silicon diode rectifiers, three in each leg of the bridge, with the usual 1,000 pF. ceramic and 470K resistor across each 400v. p.i.v. rectifier unit. Those used are an odd mixture of HR25s, 1N1763s and OA210s. The bias supply voltage doubler employs two more, and 100 μF. condensers, giving 28 volts into the bias pot.

The main h.t. supply is about 1,080 volts on no load, dropping to just over 1,000 on speech, with 45 μF. (measured) in the filter, which is built onto a sheet of bakelite, and insulated from chassis. There are five 200 μF., 275v. peak, 200v. working, capacitors in series with a 100K 1w. resistor across each condenser to equalise their potentials and discharge them when not in use.

This is a **dangerous** item, and the amplifier should not be switched on unless the **cover is on**—protecting the operator from the valve anodes and condensers, and, incidentally, preventing the large peak amounts of r.f. it can generate from getting into the exciter sitting next to it, via the microphone lead and other inter-connections.

The usual grid, screen and anode parasitic stoppers were **all** used as a precaution, but the cathodes are solidly grounded, using short strip connections. The old bakelite wafer octal sockets are preferred for this job.

Screen current peaks are very high, although the average value measured is only tens of milliamps. In order to achieve adequate regulation without the VR tubes becoming extinguished, a 200 ohm resistor in the ground end of the VR tubes has 7 volts drop with the 35 mA. of current through the VR tubes under quiescent conditions. The screen current peaks are supplied by the 200 μF. condenser and it is re-charged as current is diverted from the regulator tubes to the condenser. The voltage drops from 217 to approx. 212 without the tubes going out—a crude but effective method of achieving 3% regulation—which is quite acceptable.

The amplifier is operated without any grid current whatsoever, so smoothing of the bias supply is more important than regulation. 500 to 1,000 μF. is cheap for this supply, and it will be noted that the bias is applied before the cathodes come up to temperature. The heaters are **earthed** only via the bias supply, but this does not adversely affect performance. Switching in the h.t. winding is unconventional, but the switch should be a large fast-operating toggle; perhaps separate transformers for h.t. and heaters would be better.

(Continued on Page 5)

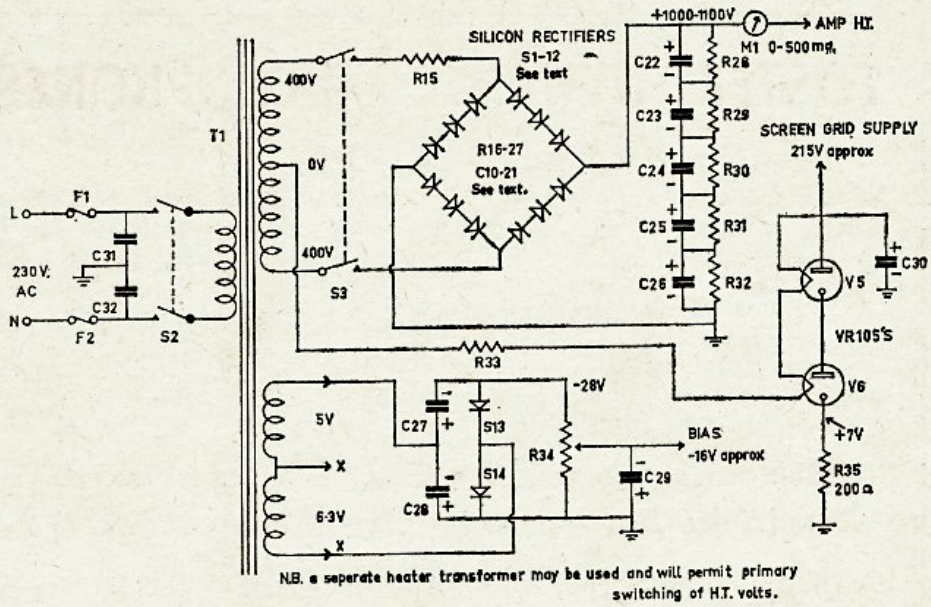


Fig. 2.—Power Supply for Passive-Grid Linear Amplifier.

PARTS LIST FOR "PASSIVE-GRID" LINEAR AMPLIFIER

C1—0.01 μF. Hi-K disc ceramic condenser.

C2—0.002 μF. x 2 kv. working Hi-K disc ceramic condenser.

C3—0.002 μF. x 2 kv. working Hi-K disc ceramic condenser (may be mica if a suitable unit can be found).

C4-C7—0.005 μF. Hi-K disc ceramic condensers, four off.

C8—14-360 pF. tuning capacitor, plate spacing at least 0.026 inch—ex disposals equipment, e.g. "Gibson Girl" transmitter, or re-insulate an old b.c. set condenser with low minimium C.

C9—Three x 500 pF. b.c. gang, A.W.A. (ex AR8 l.f. tuner). C9 may need to be supplemented by an additional 1,200 pF. external mica condenser on 160 metres.

C10-C21—1,000 pF. Hi-K tubular ceramic condensers, twelve off—one across each silicon rectifier unit.

C22-C26*—200 μF. 200 v.w. (275v. peak), five off in series, mounted on 1/16 inch thick bakelite strip—insulate from chassis.

C27 and C28—100 μF. 25 v.w. electrolytics (insulated).

C29—500 μF. 25 v.w. electrolytic (can insulated).

C30*—200 μF. 200 v.w. (same as C22)—operates OK on 215 volts.

C31 and C32—0.01 μF. Hi-K disc ceramic condensers.

R1—Nine 680 ohm, 1 watt, carbon resistors in parallel.

R2-R5—10 ohm, 1 watt, carbon resistors—four off.

R6-R9—47 ohm, ½ watt, carbon resistors—four off.

R11-R14—47 ohm, ½ watt, carbon resistors with 10-turn coil of 24 s.w.g. wire wound on each (PC1-PC4).

R15—50 ohms, 10 watt, wire wound I.R.C. resistor.

R16-R27—1 megohm, ½ watt, carbon resistors—12 off, one across each silicon rectifier.

R28-R32—100K, 1 watt, carbon resistors—five off, one across each 200 μF. condenser.

R33—5,000 ohms, 20 watts, wire wound, with slider to adjust current to give 7 or 8 volts across R35 (adjust only when "off").

R34—5,000 ohms, wire wound, potentiometer (bias control).

R35—200 ohms, wire wound, resistor.

SW1—11-position Paton industrial switch.

SW2, SW3—D.p.s.t. switches (large switches with plenty of contact travel and rapid action), ex disposals.

M1—0-500 mA. moving coil meter.

RFC1, RFC3—2.5 millihenry 4-pi r.f. chokes.

V1-V4—EL38s or 6CN6s.

V5-V6—VR105/30s.

RFC2—Special r.f. choke wound on 5 inches of ¾ inch diameter bakelited paper tube, as shown in Fig. 4, using 32 s.w.g. Lumex tough enamelled copper wire. Total length of winding just over 4 inches. This choke displays a small resonance around 10 Mc. and is quite satisfactory for 1.8 Mc.

* Note.—Most electrolytics of this size and voltage need to be "conditioned" before use by leaving each unit on a supply equal to the peak voltage rating, with 10K resistor in series. The voltage on the condenser will gradually rise and stabilise at less than ½ milliamp. leakage current—if not, suspect it and use another condenser.

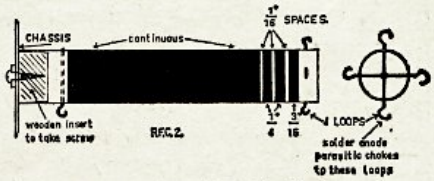


Fig. 4.—Special R.F. Choke.

L1—8 turns 1 in. long, 1¼ in. diam., tapped 5 turns, 0.8 μH.; 6½ turns, 1.2 μH.; full coil 1.6 μH. (16 s.w.g. wire).

L2—19 turns, 1¼ in. diam. x 2⅜ in. long, 8t./inch; tapped at 8 turns, 1.6 μH.; full coil, 4.8 μH. (18 s.w.g. wire).

L3—38 turns 1½ in. diam., 2⅜ in. long, 16t/inch 20 s.w.g. wire; tapped 6 turns, 2 μH.; full coil, 25 μH.

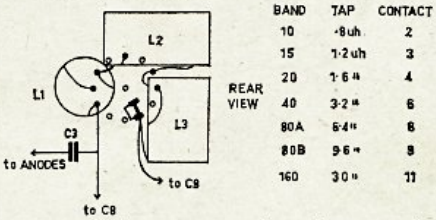
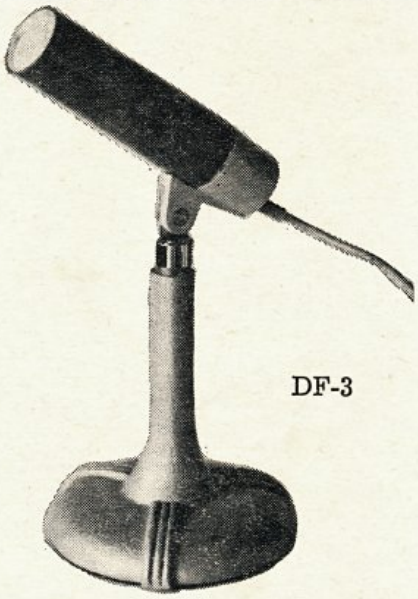


Fig. 5.—Coils are arranged on the rear of 11-position switch as shown.

These coils are space-wound and cemented to three polystyrene strips. Coils are arranged on the rear of the 11-position switch as shown in Fig. 5.

FOSTER DYNAMIC MICROPHONES



DF-3

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Effective output level .... —55 db. [0 db. = (one) 1V. Microbar]
Frequency response .... 50 to 15,000 c.p.s.

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The driving power required from the exciter is $15v.^2 \div (2 \times 75\Omega)$, i.e. 2 watts, and thus has made it possible to reduce the level of signal right through the exciter, resulting, according to reports, in a much cleaner signal. See that r.f. is piped in 70 ohm co-axial cable, with the usual s.w.r. bridge in the output circuit.

Loading and tuning the amplifier is carried out by speaking and observing the peaks on the oscilloscope monitor. The output controls are quite broad and non critical. The loading condenser and inductance are preset according to band, the netting switch operated, transmitter brought to zero beat, and then the final tuned to peak the rumbly noise from the exciter (even though the audio is shorted). Both exciter and linear (separately) are tuned on a dummy load made of twenty 1,500 ohm 5 watt carbon resistors with a germanium diode r.f. voltmeter attached.

The other versions of this amplifier using 807s and similar tubes need slightly more grid bias than the EL38s but even at 25 volts bias, the drive requirement for a 75 ohm grid resistor is less than 10 watts.

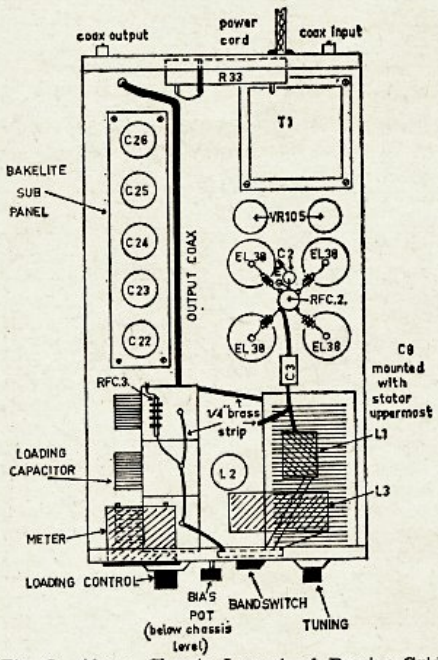

Fig. 3.—Above Chassis Layout of Passive-Grid Linear Amplifier.

Some experiment with screen voltages and grid bias voltages will soon arrive at a satisfactory operating condition. If your amplifier appears to need too much bias (and drive) try a lower screen voltage. 807s with 250v. on G2 require about 20 to 25 volts of bias, and appear to work very well indeed, but the EL38s have higher slope and shorter grid base, and are therefore easier to drive.

Any exciter using a 2E26, 807, 6146 or similar small transmitting tube will supply this with ease.

The exciter may be operated plugged to the linear without having the amplifier switched on—a small point, but this is not advisable with a grounded grid linear.

Finally, the secret of correct operation of linear amplifiers is that the plate meter needle should wave gently in the breeze, not kick violently from a low quiescent figure to the maximum stop on the meter.

This linear amplifier operates in such a fashion, but has the capacity to supply the peaks demanded by an old "leather larynx". Demonstrations are often given on 80 metres in the evenings. Transformers of the 385 to 450 volt class at 200-250 mA. are readily obtainable on the surplus market and I'm sure you can rustle up enough large pentodes or tetrodes from the junk box, so give this one a try. Suitable tubes are 807s, ATS25s, EL38s, KT88s, 6CM5s, 6BQ6s, TT21s, or VT127s.

If you have spotted a certain surplus item with four 807s in it, you have the basis of a very cheap and effective linear amplifier. The genemotor compartment will take power supply components, but I should advise more ventilation holes be drilled in the top, bottom and sides of the case. It is considered, however, that the narrow front panel, using the layout described, is much more pleasing in a neat table-top station.

SERIES RESONANT BY-PASSING FOR V.H.F. APPLICATIONS*

STEVEN E. SUMMER, WA2KYF

A cardinal rule of v.h.f. construction is to connect by-pass capacitors with the shortest possible lead lengths, but, unlikely as it may seem at first, long leads and smaller values of capacitance may provide more effective by-passing than the 500 and 1,000 pF. units now commonly used.

At 50 Mc. and above, the lead inductance and internal inductance must be considered when selecting by-pass capacitors. In the v.h.f. region the leads can be used as the inductive elements in series resonant circuits. Such a circuit is a theoretically ideal by-pass, having close to zero impedance at a single frequency. Series resonant by-passing is impractical over a wide band, and on lower frequencies, but in single-band v.h.f. converters and transmitters it may be highly effective.

Table 1

Values of capacitance in pF. required for resonance at frequencies commonly encountered in Amateur band v.h.f. work, for leads of ¼", ½" and 1" in length.

Freq. Mc.	¼" Leads	½" Leads	1" Leads
48-50	800	400	200
72	390	180	91
96	220	100	56
144	100	47	25
220	39	20	10

In using ceramic disk or dog-bone capacitors of 1,000 pF. or less, the internal or plate inductance may be neglected. Similarly, the resistive losses need not be considered, since they have no effect on the resonant frequency. Table 1 gives lead lengths and capacitance for series resonance at frequencies commonly encountered in Amateur v.h.f. work. These values were derived mathematically, but they can be checked experimentally. Simply twist the leads together and check for resonance with a grid dip meter.[1]

How does this method compare with conventional by-passing? At 144 Mc. a ceramic disk capacitor of 1,000 pF. with ¼" leads has an impedance of 10 ohms. In comparison, a 25 pF. capacitor with 1" leads has close to zero impedance. If the load impedance is high, the first capacitor would be suffcient, but for applications such as screen or cathode by-passing it might cause trouble. Also worth consideration are the greater ease of soldering and the lower possibility of heat damage with longer leads.

Transistors are appearing more widely in v.h.f. construction all the time. Their low load impedance calls for a lower value of by-pass impedance than would be acceptable in tube circuitry. Series resonant by-passing offers many advantages over more conventional methods, and can be applied in most v.h.f. applications. ●

* Reprinted from "QST", May 1963.

[1] Information in Table 1 is for total lead length twice that given. That is, the middle column infers two ½ inch leads, or one ¼ inch and one ¾ inch, etc. Values are approximate, and will depend on arrangement of leads. For example, a 10 pF. capacitor with 1 inch leads connected together and formed into a circular loop resonates at 220 Mc. The same leads running parallel about 3/16 inch apart resonate up around 275 Mc.

If the capacitor is to be installed at some point where it is accessible with a dipper coil, short the terminal being by-passed to ground with a screwdriver blade or some other low-inductance device, and check for resonance. Adjust the lead length (either side of the capacitor) for resonance at the middle of the desired frequency range. Another good check, particularly in screen by-passing of transmitter amplifier stages, is to set up your favourite system for checking neutralisation, and then trim the capacitor lead length until the best indication is observed.

Series resonance is rather broad, so precise adjustment may not be necessary. Of the various arrangements indicated for a given frequency in Table 1, the high capacitance and short lead combination is preferable as there will be less likelihood of unwanted coupling to other circuits. Example: For 144 Mc., a 100 pF. capacitor with ¼ inch leads would ordinarily be preferable to a 25 pF. with 1 inch leads.—Editor, "QST."

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The Tri-Band Birdcage*

GEORGE COUSINS, VE1TG

AFTER moving from Ontario to the Annapolis Valley of Nova Scotia in November 1959, the first problem was to find a place to live, and the second was to get back on the air. With winter coming on, the antenna problem had to be solved in a hurry, so between the trees appeared a scandalous conglomeration of long-wires, doublets and other arrays, mostly for 20 metres.

Of course with my good friend VE1GA only four houses away across the field, it wasn't long before I was very conscious of the results he was getting with his three-element wide spaced beam. The difference was that he is a permanent resident while I am a transient, so a beam was considered a bit too much for me to invest in. A good compromise seemed to be the cubical quad, so work was begun, with the XYL's clothes pole in mind for a support.

Two quads were built during the winter, but didn't survive. Finally came spring, and with it a copy of "CQ," complete with an article on the G4ZU Bird Cage[1]. This looked so interesting I was sold on it before I was half way through the article. The birdcage was constructed from the article for 20 metres only and was duly propped up against the clothes line pole.

The bottom elements were 2½ feet off the ground, but having no tower this couldn't be helped, so the thing was tuned up where it stood. All the methods tried, failed to bring the s.w.r. down under about 2 : 1. Deciding that the elements must be too long, we tried all sorts of capacitor arrangements, to no avail, so a pi-network coil from a surplus transmitter was placed in series with the coax. and the s.w.r. came down very smoothly to 1.05 : 1.

The thing was pointed south and a tentative CQ sent forth on c.w. A PY7 came back immediately with a 5 8/9 9 report, so there was great rejoicing in the VE1TG shack. Considering the generally poor conditions on 20 at the time, this was considered to be pretty good.

The problem of rotating had to be solved. A hole was dug about 4 feet deep in the back yard and a piece of water pipe 6 feet long was inserted. The cage was placed on top of this, leaving the lower elements about 2 feet off the ground. It could be rotated with one finger, so a motor was considered unnecessary at this time.

TRI-BAND CAGE

After a tower was built, the cage was examined critically and immediately the thought came to mind; why not a tri-bander? So away we went, and this is the result.

• The G4ZU Bird Cage in a previous issue of "CQ" inspired VE1TG to create this three-band birdcage for 10, 15 and 20 metres.

Fig. 1 shows most of the construction details. The mast is a 20-foot section of 2" o.d. aluminium irrigation tubing with a very thin wall and very light weight. A piece of 2" x 2" clear pine is turned down and driven into the tubing, making a solid wood insert a little longer than the length of the pipe, and so creating much greater strength than either would possess alone.

The elements were cut from lengths of 65S-T aluminium tubing, using 1" o.d. for the 20 metre elements, and ¾" o.d. for the 15 and 10 metre elements. The 20 metre elements were 0.052 wall and the others were 0.035. By careful planning and checking to see what stock lengths are available, the elements can be cut with very little waste. Don't throw away any extra pieces; you may be making Gamma or T matches before you're through and they will come in handy. The phasing lines are made of No. 12 wire with solder lugs on the ends, which are then bolted to the elements. The aluminium should be cleaned before the lug is tightened into place. I also coated the whole joint with clear plastic which is available in most hardware stores. The lengths which I eventually ended up using are:

20 metres—
Elements 8' 8"
Phasing lines 17'

15 metres—
Elements 5' 8"
Phasing lines 11' 7"

10 metres—
Elements 4' 4"
Phasing lines 8' 8"

The phasing lines are only approximate lengths and should not be cut until the points mentioned later are understood. There are eight elements and four phasing lines required for each band.

Six mounting plates are required for the elements. They are cut from ⅝ or ¾ plywood, and should be primed and painted before mounting. The 20 metre plates are 1½' square, and the others are 1' square. Two inch diameter holes are cut in the centre of the plates so that they will fit tightly over the mast. The plates are eventually bolted to the mast using non-rusting hardware and angle shelf brackets. Remember the spacing requirements for each band. The best method is to mark out the spacing required between the top plates and then bolt them in place on the mast, remembering to keep them in line with each other so that the elements will also be in line when they are fitted. The mast can be laid across two boxes or saw-horses while this is being done. By placing the top elements near the top of the mast, there will be about two feet of mast left at the bottom for fastening to an extension shaft.

The elements are fastened to the plates at right angles to each other, using water pipe straps bolted to the plates. This is shown in Fig. 1. A brass wood screw is also run through the element into the wood to prevent the element from turning or slipping out.

Remember to fasten shorting strips of copper braid or other suitable material to the top elements. Select two adjacent elements for the driven element and short them together. Do the same for the parasitic element. Do not allow the shorting strips or the elements to touch the mast, and remember as you proceed with the other bands, to keep the same relationship between elements all the way down.

Not having much faith in a 9' length of tubing suspended from only one end, I extended the wooden insert out the top of the mast by a couple of feet and then ran guys from the top of this extension to the outer regions of the 20 metre top elements. These guys are nylon here, but in any case should be non-metallic and of a mat-

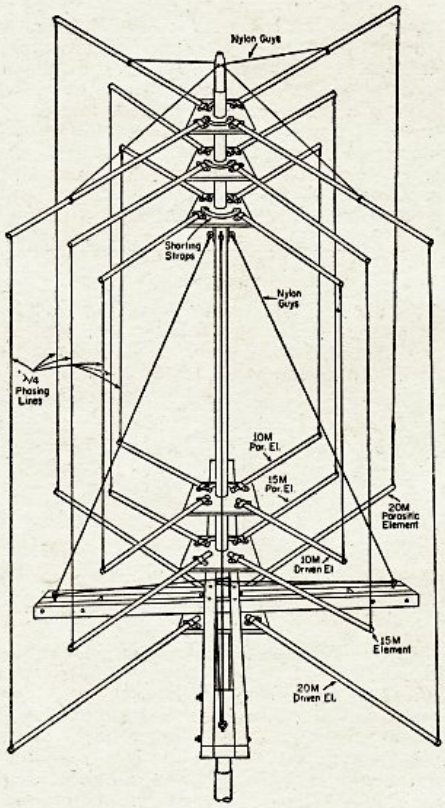

Fig. 1.—Basic structure of the Tri-Band Birdcage for 10, 15 and 20 metres. The overall height is 18 feet and the turning radius is 9 feet. All guys are non metallic (nylon or glass-line). The tuning devices are not shown in the drawing.

* Reprinted from "CQ," July 1963.

[1] Bird, D., "The G4ZU 'Bird Cage' Aerial," "CQ," April 1960, page 40; and "Amateur Radio," July 1960, page 10.

erial which is reasonably free from stretching or contracting when the weather changes. So far these guys have prevented any sag or bending in the elements.

Providing all has been done carefully, the top elements should be in place by now, and all lined up with each other. Now the phasing lines can be connected to the top elements and the bottom plates can be slipped on the mast. Install the bottom elements on the plates, but if you are going to tune it up on the ground don't bolt the bottom plates yet, as you will have to adjust the lengths of the phasing lines to bring the elements into the required resonance, and this will naturally mean having to move the position of the bottom plates. When this is all done, the plates should be bolted into place so that the phasing lines are stretched tightly between their appropriate elements.

If you intend to tune it up on top of the tower, cut the phasing lines for the lengths in the above table and bolt everything in place. This is what I did, so read on and see how it turned out for me; then make your own decision. An awful lot will depend on how easy it is to work on top of your tower or whatever you are going to stand the antenna upon. I found the tuning did not vary enough to worry about between ground level and 32 feet in the air. However, this will depend on location and surroundings, so should be left to the discretion of the builder. Everyone will have his own pet ideas but remember—be sure you can reach the 10 and 15 metre lower elements when you have it up there! If you can't, you had better do at least preliminary tuning on the ground, and take your chances on how it will work up there. Here again a lot will depend on the design of the tower and also on how long a reach you have.

RAISING THE ANTENNA

After spending many hours reading articles on antenna construction, I notice very little is ever said about how to get the things up in the air. In this case it depends on the design of the tower, height, and facilities available. When the antenna is completely assembled on the ground you will have something resembling an overgrown porcupine and just about as easy to grasp.

As soon as you decide to build the antenna (if you do) start cultivating friends—you'll need them for the great day. Also, if at all possible, I would suggest you try to tailor your tower to the needs of the antenna. Visualising lots of fun when the big day arrived, I built the tower with a 3-foot square top and with a platform about 4 feet down from the top. In this way, three men can work at the top with lots of safety. This is a good thing to point out to your friends when requesting volunteers for the raising. Even with this, there is a bit of fun in store when you get three men and an antenna all struggling away on top at the same time.

We raised the antenna all in one piece, completely assembled, by sheer manpower. Don't do it! We bent one element (one of the very top ones, of course) and also put a dent in the mast. Luckily both of these faults were remedied without too much trouble but they could have been a lot worse.

Further experimenting has proven that the easiest way to accomplish the task is one of the following:

Method 1: Mount a gin pole at the top of the tower, complete with a small block and tackle, and rig a rope sling around the mast in such a way that it can be raised vertically. The gin pole should be high enough so that the mast will clear the top of the tower and the base can be then swung into place.

Method 2: Release all the plywood plates except the top one. Slide them all up to the top of the mast in a tight group, and then proceed as before with the gin pole. The difference is that you now have about 18 feet of mast to grasp and also all your elements will be at one end—an important point when you're trying to keep an eye on all 24 of them at once!

Method 3: Remove the plates and elements as complete units. Stack them at the top of the tower in the correct order. Run the mast up through the inside of the tower and through the plates also. Bolt the top plate, slide the mast up, bolt the next plate, slide the mast up, etc., until the elements are all in place.

A combination of method 1 and 2 was tried out when we had to lower the antenna in order to straighten out the top element and it worked out fine. The gin pole also serves to support the antenna while you're taking a breather and getting your support problems straightened away. You'll need a rest by this time and something has to hold the thing up!

GUYING

Before tuning or anything else you must make sure the thing will stay up and I for one have little faith in a structure this high, standing there all by itself, in the winds we get around here. Guys there must be, but in such a way that they will not interfere with the rotation of the antenna. This can be quite a problem, in a closed loop system such as this.

The solution here, shown in Fig. 2, was to install two wooden booms at right angles on the mast itself, as low as possible, without interfering with rotation. Mine are mounted just on top of the lower 20 metre elements, and each boom is made up from two lengths of 2" x 2" x 14' lumber, with a piece of 2" x 2" x 3' at each end. The centre point of the boom is bolted through the mast and the ends are fitted with eye bolts.

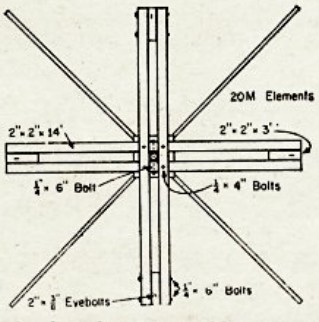

Fig. 2.—Guy boom assembly, top view.

The guys should be non-metallic. I used a new type of plastic clothes line with a tensile strength of 750 lbs. Each guy is fastened to the mast just below the top 10 metre element and is then taken out to the end of the boom where it is passed through the eye bolt and run back in to the mast at the bottom. It is tied here and by adjusting the tension on each of the guys, the mast can be held straight.

FEEDING

Separate coaxial cables are used to feed the three sections of the antenna. Though originally intended, I understand, to match 52 ohm, I decided to use the 72 ohm RG-59/U which I had on hand and had no difficulty in bringing the s.w.r. down. Possibly the Tri-Gamma match mentioned in W6SAI's Quad Handbook could be made to work here, but personally I prefer the separate cables.

When it comes time for tuning, if you don't have an s.w.r. bridge and a grid dip meter, beg, borrow or buy them. Also, enlist the aid of another Ham. It is necessary to have one man at the transmitter and one on top of the tower.

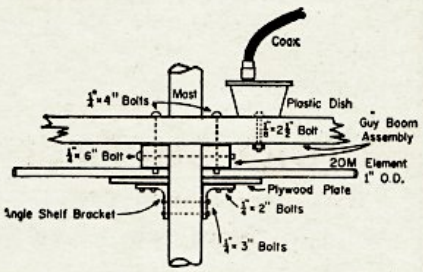

Fig. 3.—Details of the guy boom and twenty metre element mounting assemblies. The plastic box contains the gamma capacitor.

First decide whether you want a director or a reflector. The original article called for a reflector, but this has been changed now to a director. In any case get the grid dip meter to work and check the driven element. I found that, even though I had cut the chasing wires so that the total element was theoretically longer than the low end of each band called for, the measured frequency of resonance was considerably higher than the upper band limits. This may be due to the proximity of other wires for the other bands, but in any case is not too much to worry about.

Faced with this problem on the ground, the phasing lines can be lengthened to the extent necessary to bring the element into resonance at the correct point. However, I was on the top of the tower by the time I discovered this, so changing the lines was definitely "out". Instead, a small coil of about 6 turns of No. 12 wire 2" in diameter was made of B. & W. coil stock and inserted in the driven element. The coil was then carefully pruned while checking with the meter until the frequency of resonance was as required. I adjusted for resonance at the centre of the DX phone band in each case. However, as will be seen, the exact frequency of resonance is not too important.

(Continued on Page 11)

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A Simple 160 Metre Antenna

HAROLD L. HEPBURN, VK3AFQ*

• It is the purpose of this article to describe the development of a portable (not mobile) vertical antenna for use in the 1.8, 3.5 and 7.0 Mc. Amateur bands.

SINCE the authorisation of the 1.80-1.86 Mc. allocation in 1963, its use, in VK3 at any rate, has been sporadic and mainly confined to Amateurs who have had sufficient real estate available to erect the conventional half wave dipole or at least a wire long enough to act as a reasonable radiator on the frequency. The average suburban block in the 55 x 150 ft. category does not lend itself to such arrays and it is perhaps for this reason that 160 metres has not enjoyed great popularity.

For local working (and in these days of low sunspot activity for DX as well) 160 metres is an excellent band. Only small inputs are required to the final to provide truly arm-chair local contacts on phone or S8-9 c.w. contacts up to 2-300 miles. Recent trials, carried out mainly by VK3YQ, have shown that the weekly VK3WI broadcast relays on 1.8270 Mc. have given a more reliable suburban coverage with 20 watts than the 80 metre 500 watt "rockcrusher".

More recently the need to provide additional command links for VK3 W.I.C.E.N. activities has emphasised the real need for an antenna which was both efficient and portable. Whilst it was in the light of this latter requirement that the antenna to be described was developed, its essential suitability as a permanent fixture for home use will, I hope, be ovious.

Basically this antenna is a centre loaded vertical whip with a fixed matching network at the base to enable it to be fed with 50 ohm co-axial cable. It is light (less than 15 lbs. in spite of its 25 ft. height) and can, quite literally, be put up with one hand. Furthermore, it is free standing and to date has been in the writer's back yard through quite severe wind storms without any signs of wanting to become a grounded horizontal!

Reference to any of the standard text books (A.R.R.L., R.S.G.B., etc.) shows that the total resistance of a coil loaded vertical antenna is composed of three main parts, the ground resistance R_G, the resistance of the coil R_C, and the radiation resistance R_R.

As it is only the radiation resistance R_R which is effective in transforming the input r.f. into a useable form, it is clear that any steps taken to reduce power losses in the ground resistance R_G or the coil resistance R_C will improve the performance of the antenna as a radiator.

These same text books stipulate that the loading coil should have a high Q and typical 160 metre centre loading coils are quoted which have around a hundred turns on a 2-3" diameter former. Besides the high ohmic resistance, such coils present a very real mechanical problem when inserted in the centre of even a 12 ft. whip.

The twin problems of small size and weight and high inductance with low resistance values can be met by ferrite toroids. Typically a suitable air cored inductance of say 130 micro-henries would consist of 80 turns of 14 gauge wire on a 3" diameter former, would be about 9" long and would weigh (together with its end cap and supports) some 3 to 4 lbs.

A toroid on the other hand can give this inductance with about 60 turns of 20 gauge wire in a space only 2" in diameter and about ½" deep. Besides the fact that the physical size has been very greatly reduced, the weight is only some 4-5 ounces and a quick calculation shows that the ohmic resistance has dropped by about 40%.

With these advantages in mind, a prototype antenna was constructed.

MECHANICAL CONSTRUCTION

The radiator proper consisted of a 14 ft. length of 1" o.d. 16 gauge aluminium tubing and a 12 ft., three section, copper clad steel tank whip, obtainable from disposals. Whilst aluminium tube is recommended if portable work is envisaged, there is no reason why ¾" galvanised waterpipe could not be used if a fixed home antenna is required.

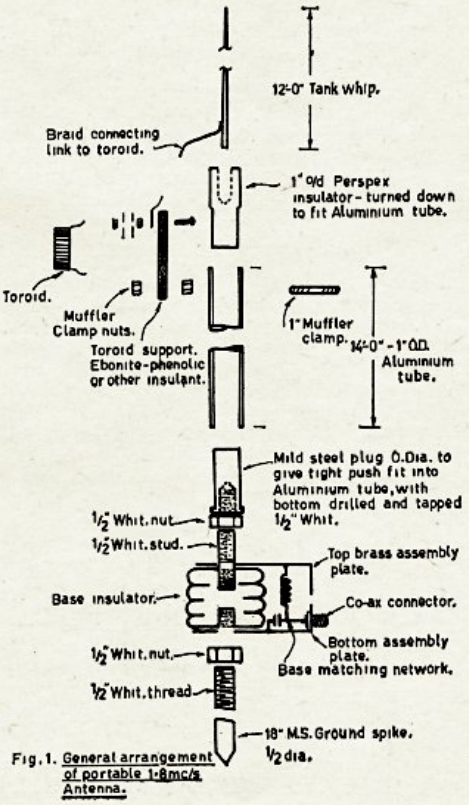


Fig. 1. General arrangement of portable 1-8mc/s Antenna.

The bottom 1" tube and the tank whip are separated electrically but joined mechanically by means of a centre insulator. In the case described this insulator was a 4" length of 1" o.d. perspex rod which was turned down for half its length to be a tight push fit into the aluminium tube and the other half drilled axially to accept the base of the tank whip. Reference to the exploded construction diagram (Fig. 1) will assist this and subsequent written explanation.

While perspex was used in this case, its use is not mandatory and any other insulating rod will do provided it does not absorb moisture, is mechanically strong and can be drilled and turned. Ebonite rod fits these requirements and is by far the cheapest of the alternatives offering.

The toroid (a Ducon yellow spot) provides the electrical continuity between the two halves of the whip and mechanically is mounted on a small piece of insulating material held in place by means of a car muffler clamp round the top of the aluminium tube. This muffler clamp also acts to hold the centre insulator in place if a fine saw cut is made for 1½" down one side of the aluminium tube. In addition the clamp provides electrical contact to the bottom half of the antenna. Electrical contact to the top half (the tank whip) is made via a short length of braid (taken from some scrap co-axial cable) which is soldered to the tank whip.

The base insulator is an S.E.C. throw-out. It is 3½" in diameter and 4" high. In each end is a metal plug which is tapped ½" Whitworth. To the top and bottom of this insulator are fitted two L shaped pieces of 16g. brass sheet which are 3" wide. The top brass piece is secured to the insulator by means of a short length of ½" Whitworth studding (a 3" x ½" bolt with the head cut off) and a ½" Whitworth hexagon nut. The length of the stud should be such that when the top plate is assembled into the insulator about 1" of the threaded stud remains above the top of the nut. This residual length screws into a mating tapped hole in a mild steel plug fitted to the bottom of the aluminium tube.

The bottom brass plate (the shorter arm of which is fitted with a co-axial socket) is fitted to the other end of the insulator by means of a nut and about 2" of thread cut on the end of 18" of ½" mild steel reinforcing rod. The other end of the rod is ground off to a point and the whole assembly is pushed into the ground so that it rests on the bottom plate. This unit is very strong and is quite adequate to withstand the swaying action of the 25 ft. unguyed whip.

The short arms of the L shaped brass plates extend some 3" beyond one side of the insulator and are made rigid by means of two short insulating pieces bolted between them. There is thus

* 4 Elizabeth Street, East Brighton, Vic.

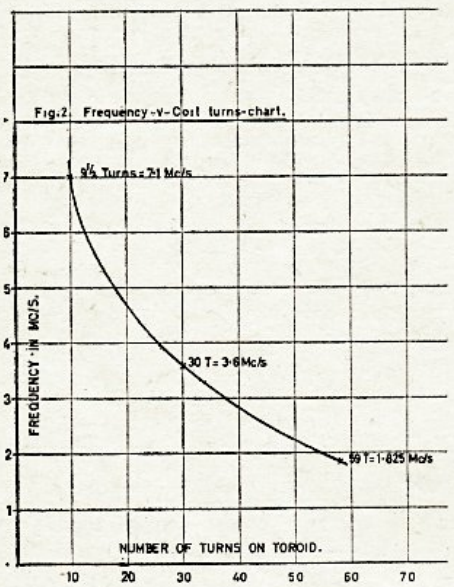
formed a protected space of about 3" cube which houses the base matching network.

The mechanical work having been satisfactorily completed, it remained to get the whip on to the required frequency.

RESONATING THE WHIP

The description which follows applies not only to the one case but to all similar cases. Within wide limits the method of resonating the whip and matching it to the transmission line given here can be used for whips of different lengths and on different frequencies. Only the figures quoted apply specifically to this antenna.

The first step was to make a small air spaced coil 1½" in diameter and about ½" long, containing (for 1825 kc.) four turns of 16 gauge wire. This coil was soldered across the brass base plates and acts as a coupling link to the g.d.o., used to measure the resonant frequency of the whip. Next the toroid was covered with insulating tape to prevent shorts between the wire and the core and then wound with some seventy turns of 20 gauge enamelled wire. This has to be done by hand and is a little tedious, but if winding is started from the centre of a 12 ft. length of wire the threading up process is a bit easier.



Make sure that the first and last turns are separated by about ¼"; if necessary, backwinding the last few turns to achieve this. Failure to leave this space on the first run led to a lot of heartache as the first and last turns welded together when r.f. from the transmitter was applied.

Having wound the toroid it was connected between the top and bottom antenna sections and a g.d.o. reading taken via the link across the base insulators. In order to establish the correct number of turns on the toroid for a variety of frequencies, five turns at a time were taken off and fresh g.d.o. readings taken. A plot of turns vs. frequency was obtained and is given in Fig. 2. From this graph the number of turns required to resonate at 1825 kc. was found and the toroid re-wound with this number on it. The number taken was exact and the antenna came up on 1825 kc. first off. This may have been luck, but at the very worst the addition or subtraction of one turn is all that should be necessary if care has been taken in drawing the graph.

So far so good. We now had a self standing antenna resonant on 1825 kc.

MATCHING TO FEED LINE

However one problem remained. That of getting it matched to the 50 ohm feed line. Reference to the literature indicated that (at 1825 kc. at any rate) the feed impedance would be low and probably in the 3-5 ohm region.

Some fancy work with an "Antennascope" gave readings of 75 ohms, too good to be true, and finally given the lie direct by trying to feed it with this impedance cable and getting a s.w.r. of well over 10. The reason for the nice null obtained at 75 ohms on 1825 kc. still remains obscure. Anyhow as it was not possible to get a direct measurement of feed impedance, matching was done on an experimental basis.

Firstly, the assumption was made that the antenna feed impedance was five ohms or lower at the design frequency. Reference was then made to an excellent article on vertical antenna and matching problems in the July 1961 issue of "CQ".

In this article the design procedures and calculations for "L" matching networks for short vertical antennae are set out and the approximate size of the capacitance and inductance required in the experimental matching network was determined from this information.

For the antenna under development the article indicated that an appropriate "L" network would require a shunt capacitance of 3,000 to 5,000 pF. and a series inductance of somewhere between 0.5 and 2 micro-henries.

Accordingly a very flexible experimental network was breadboarded. It consisted of a three-gang broadcast capacitor, a small roller inductance and a series of fixed mica capacitors of 1,000 pF. each which could be padded across the gang by means of crocodile clips. Fig. 3 gives the entire test set-up.

The matching procedure was as follows. The original base coupling link was removed and with no additional capacity across the gang and with the transmitter switched on (1825 kc., of course) the variable inductance was moved from zero to maximum, noting the effect of this change on the s.w.r. Then the gang was swung through from zero to maximum capacity and the effect on s.w.r. again noted. An additional 1,000 pF. was clipped across the gang and the process was repeated,

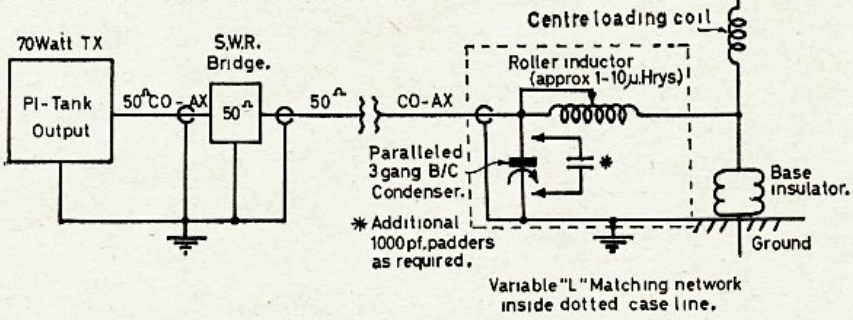


Fig. 3. Experimental base matching network.

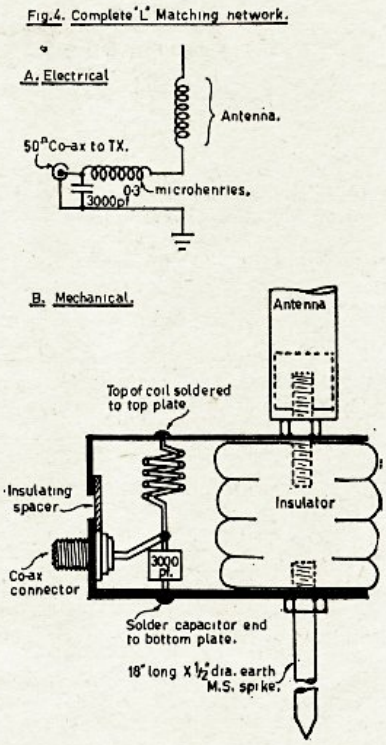


Fig. 4. Complete 'L' Matching network.

once again noting the effect on s.w.r. A second and then a third 1,000 pF. capacitors were clipped across the gang and both capacity and inductance varied across their range. The transmitter was kept on resonance at all times.

For the 1825 kc. frequency the s.w.r. did not drop appreciably from a high value until some 2,000 pF. was in circuit (one 1,000 pF. fixed and the gang right in). The inductance did not appear to be very critical and a couple of turns either way did not vary the s.w.r. to any great extent.

Ultimately a position was found where the s.w.r. had been reduced practically to unity. At this stage the values of inductance and capacitance in circuit were measured (using the g.d.o. again) and one fixed capacitor and a small coil of the correct sizes soldered direct into the small "box" at the base of the antenna.

A quick trial with r.f. showed that the s.w.r. had remained the same as with the breadboard experimental hook up. The final values found at 1825 kc. for this antenna were 3,000

pF. and 0.3 micro-henries, the latter consisting of 4 turns of 16 gauge enamelled wire on a coil 1¼" diameter and 1¼" long. The coil was air spaced and the turns separated by using three strips of insulating tape. If you want to make a better job, mount the coil on a small strip of drilled polystyrene or phenolic board. Fig. 4 gives both the electrical, schematic and a diagram of the finished matching network at the base of the antenna.

Mention can well be made here of a feature of the s.w.r. bridge which proved most useful in these tests.

The bridge itself was a coiled coaxial one straight out of the A.R.R.L. Handbook, but the meter used was a surplus turn and bank indicator. These meters have two extremely sensitive movements and, by using one movement for forward power and one for reflected power, general relationship between them is visible at all times and one does not have to go through the bother of switching between the two to make a reading. The internal shunts had been removed from the meter and a dual 100,000 ohm carbon potentiometer used as a sensitivity control. The circuit is given in Fig. 5.

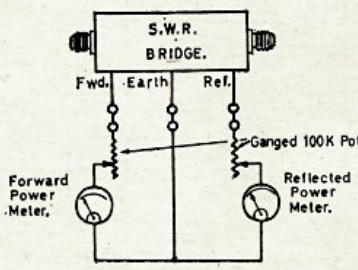


Fig.5. Dual S.W.R. Indicator.

RESULTS

On the air, results were most encouraging. For local contacts, i.e. up to 20 miles, there was no significant difference reported between the whip and a three-eighth wave end tuned wire used as a standard of comparison. Some stations reported a small drop in signal on the whip, some reported no measurable difference, and some reported a slight improvement using the whip. It can thus be stated with every confidence that the whip is as good as a long tuned wire for local contacts on 160 metres.

For longer hauls—up to 150 miles—the results were equally encouraging. Although the whip did not perform as well as the long wire, the average difference was only two S points. Where distant stations had set their S meter to 9 on the long wire, changing to the whip gave reports varying between S6 and S8. These comparisons were made on phone, so that the difference would be of considerably less consequence if c.w. had been used.

USE ON OTHER BANDS

By using a different number of turns on the toroid and different constants in the matching network, it is possible to use a vertical of the dimensions given on 3.5 and 7 Mc. since in both these cases the physical length is less than a quarter wave and needs inductive loading.

By following the method of tuning and matching given in this article, a well matched radiator on 1.8, 3.5 or 7 Mc. can be constructed.

USE OF GROUND RADIALS

Reference was made at the beginning of this article to the effect of the ground resistance R_G. In any vertical whip—no matter whether mobile or fixed—this ground resistance is large. The simple earth spike used in developing the antenna described was about the simplest (and thus the worst!) earth that could have been used. To overcome completely the effect of the ground resistance, the classical solution is to provide 32 quarter wave radials fanned out from the base of the antenna. On 1825 kc. this would mean 32 wires each about 130 ft. long, or just over ¾ mile of wire! The perfect solution is thus not a practical proposition. However, to do nothing about minimising the ground resistance is poor practice and a compromise solution was adopted.

Since the antenna was designed with portability in mind, six 30 ft. lengths of electrician's earthing wire were used to provide a better earth path. They were arranged in three sets of two wires. Each pair had a common connection to a battery charging clip which was snapped on to the lower brass plate of the antenna base and the two free ends each soldered to a 4" tent peg. The six wires were fanned out about 60 degrees and simply left lying on the ground, the tent pegs serving to locate the ends in the right spot. If you want to provide guys, each alternate tent peg can be used as a guy anchor.

The results quoted above were obtained without the use of the radials and comparative tests with and without them are still in progress.

Use of anything between no radials and the six recommended does not change either the tuning or the matching of the antenna—only its radiating efficiency. ●

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THE TRI-BAND BIRDCAGE

(Continued from Page 7)

Having resonated the element, the coaxial cable was attached. The outside shield of the cable was attached to the exact centre of the small coil and the inner conductor was connected to a small gamma matching section. In the case of the 20 metre section, the gamma bar is about 30" long and the capacitor is a 75 pF. I feel these values will serve as a good general starting point, but would not necessarily always be correct. However, this is not different from any other type of antenna matching arrangement.

With an assistant on top of the tower to tune the capacitor, the s.w.r. was quickly brought down to 1.1 on 20 metres. Checking across the band revealed a total swing of from 1.05 at the lowest point to 1.2 at the highest point, with no difficulty.

The 15 metre section was tuned in the same manner, as far as the driven element was concerned. Again it was necessary to use a small coil in the element. This one was constructed from 6 turns of ¼" copper gas line, 2" i.d., and close spaced. Again it must be realised that the necessity for these coils may not arise and even if it does, the size required may not be the same as mentioned here. However, it is well to know how the problem was solved here, in order to save time in another installation.

The 10 metre element was found to require a small coil of tubing containing 3 turns 2" i.d. and the spacing adjusted until resonance was attained. Fig. 4 shows the gamma matches as they are here.

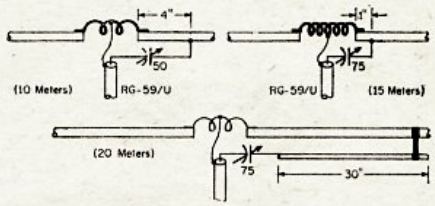


Fig. 4.—Specifications for the gamma matches for each band. The coils are wound on a 2 inch i.d. While the exact number of turns will vary with individual installations, as will the feed points, the measurements used will provide some idea for a starting point. 10 mx: 3 turns ¼ inch copper; 15 mx: 6 turns ¼ inch copper; 20 mx: 3 turns No. 12. The gamma bar for 20 metres is a ¾ inch tube.

The directors are tuned by the use of wire stubs on each element. In my case the 20 metre stub is 4½ feet long, the 15 metre one is 36 inches long, and the 10 metre one is 24 inches long. This will give a good starting dimension in each case. The final adjustment is done by any of the methods shown in antenna handbooks. I used the grid dip meter to set the directors for a frequency about 5% higher than the driven elements and then enlisted the aid of another Amateur who lives a few miles away. Using his receiver and S meter the stubs were then given a final adjustment. The eventual lengths are very close to those given above. ●

Modification to Command Receiver

E. C. MANIFOLD, VK3EM*

HAVING been interested in using the Command receiver for finding hidden transmitters for some years (3-6 Mc., BC454), it has been obvious that there is insufficient audio for mobile work.

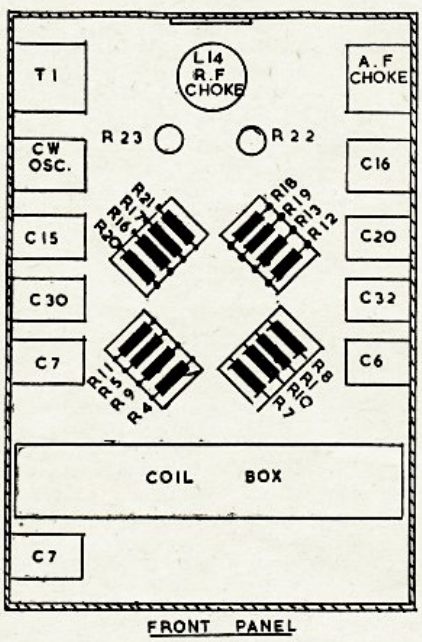
In an endeavour to overcome this, as a stop gap, the 1430 kc. i.f. was fed into the car receiver, and while this worked well enough, it was a bit hard on the car battery, with a mobile radiophone operating and no engine running.

EXTRA AUDIO

After looking at possible ways to improve things, and trying some of them, the present arrangement appears to be the most satisfactory, with a minimum of alteration to the receiver.

The original 12SR7 second detector, b.f.o. tube was removed, and a 12AH7 rewired into this socket for use as the first audio and b.f.o. tube, and an OA85 installed as the second detector, as shown in the circuit diagram, Fig. 1.

While a 12SL7 may have been a better choice for greater audio, there were several 12AH7s available, and have proved satisfactory.



Location of components beneath the chassis.

ADDING A.V.C.

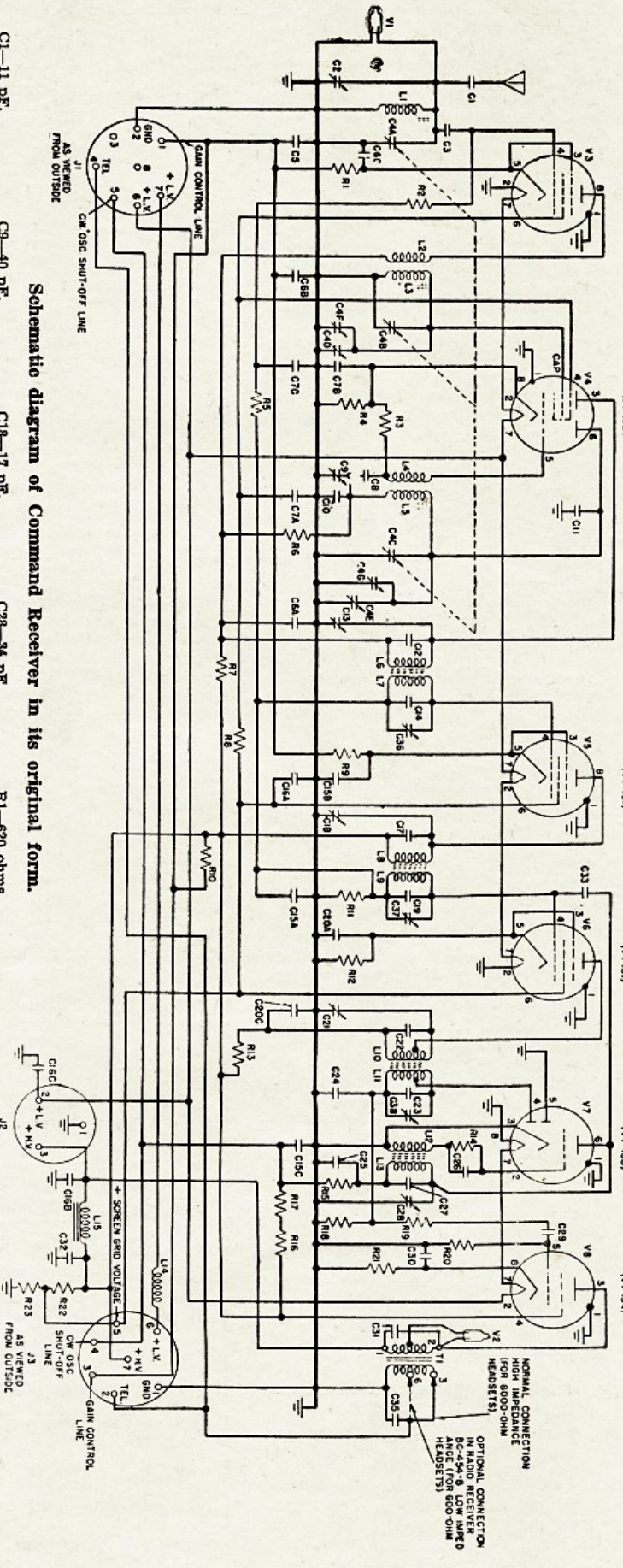
It was thought that since a.v.c. is so easy to instal, this would be an advantage for phone operation, although not used when transmitter hunting, as c.w. is used for identification and bearings. But in mobile phone operation, it is necessary.

(Continued on opposite page)

* 267 Jasper Road, McKinnon, S.E.14, Vic.

C1—11 pF.
C2—15 pF.
C3—100 pF.
C4 (A to G)—Gang (147 pF.)
C5—3 µF.
C6—(A, B, C)—0.05/0.05/0.05 µF.
C7 (A, B, C)—0.05/0.05/0.05 µF.
C8—200 pF.
C9—40 pF.
C10—365 pF.
C11—3 pF.
C12—180 pF.
C13—17 pF.
C14—180 pF.
C15 (A, B, C)—0.05/0.05/0.05 µF.
C16 (A, B, C)—0.22/0.22/0.22 µF.
C17—180 pF.
C18—17 pF.
C19—180 pF.
C20 (A, B, C)—0.05/0.05/0.05 µF.
C21—17 pF.
C22—180 pF.
C23—180 pF.
C24—200 pF.
C25—0.001 µF.
C26—100 pF.
C27—180 pF.
C28—34 pF.
C29—0.006 µF.
C30—15 µF.
C31—0.001 µF.
C32—5 µF.
C33—Wiring Capacitance (under 2 pF.)
R1—620 ohms
R2—2 megohms
R3—51,000 ohms
R4—620 ohms
R5—150,000 ohms
R6—200,000 ohms
R7—200 ohms
R8—200 ohms
R9—620 ohms
R10—360,000 ohms
R11—100,000 ohms
R12—510 ohms
R13—200 ohms
R14—100,000 ohms
R15—5,100 ohms
R16—51,000 ohms
R17—51,000 ohms
R18—510,000 ohms
R19—100,000 ohms
R20—2 megohms
R21—1,500 ohms
R22—7,000 ohms
R23—7,000 ohms
L1—Antenna Input
L2, L3—RF Amp.
L4, L5—RF osc.
L6, L7—In 1st IF
L8, L9—In 2nd IF
L10, L11—In 3rd IF
L12, L13—CW Osc.
L14—RF Choke, 112 Microhenrys
L15—AF Choke, 3 Henrys
VT131—12SK7
VT132—12K8
VT133—12SR7
VT134—12A6

Schematic diagram of Command Receiver in its original form.



This was achieved by removing the 0.1 megohm grid resistor R11 on the second i.f. transformer, and fitting a 2 meg. resistor in its place, removing the earth wire from one end and connecting this point to the end of the diode load resistor R18.

From the opposite end of the 2 meg. resistor, run a wire to the front panel box, to connect to the a.v.c. off/b.f.o. on switch, under the tuning dial. This box will contain a.v.c./b.f.o. switch, 10K cathode bias gain control, and audio output pack—all miniature types as there is very little room.

R.F. STAGE BIAS

It was found that the bias resistor to the 12SK7 r.f. stage was 620 ohms and, when measured, the bias was 6 volts, at maximum gain position of the gain pot. Installing a 400 ohm resistor in its place reduced the bias to 3 volts with an increase of signal gain. Changing the i.f. valves bias resistors did not improve the gain enough to warrant the change over.

SPEAKER OPERATION

The original output transformer, while suitable for phone operation, has to be replaced for speaker operation, and a miniature speaker transformer was installed in its place in the rear of the chassis. This should match the 12A6 output valve, 7,500 ohms to voice coil impedance.

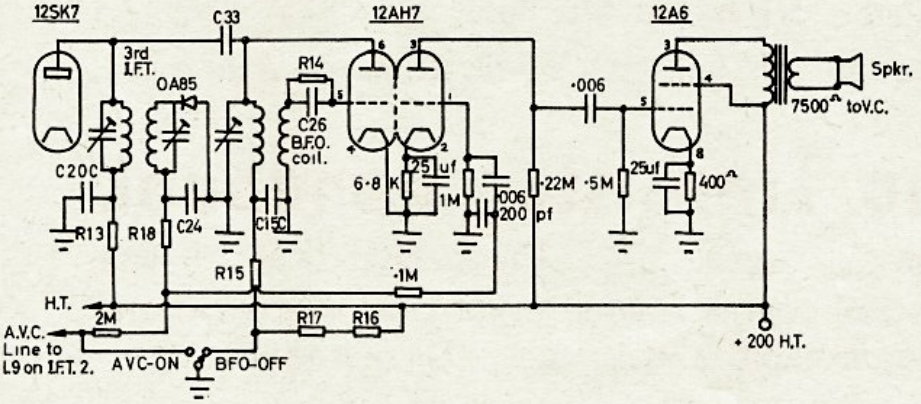


Fig.1. Modified "COMMAND" Receiver-detector & audio circuits.

With the greater audio gain, the motor generator whine became very noticable and an 8 µF. 600 p.v. electrolytic was installed across the h.t. line for extra ripple filtering.

It will be found that the original 12A6 grid resistor is 2 megohms. This should be replaced with a 0.5 megohm resistor and the cathode bias resistor of 1,500 ohms can be replaced with 400-500 ohms.

While this will give a higher than normal grid bias for the 12A6, sufficient audio will be available for mobile operation and, at the same time, will reduce the plate current and battery power drain.

These modifications could be made to other ranges of the Command receiver if desired for mobile operation.

Preliminary Announcement of 7th Jamboree-on-the-Air, 1964

The 7th Jamboree-on-the-Air is to start at 0001 hours G.M.T. on Saturday, 17th October, and will finish at 2359 hours G.M.T. on Sunday, 18th October, 1964.

Special stations proposing to be on include—

VE3WSB—World Scout Bureau, Ottawa, Canada.

GB3BPH—Baden-Powell House, in London.

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MERCURY AWARD

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Scoring is as follows: QSOs with each member station counts as one point per band and stations can be contacted on more than one band, each QSO counts one point. Contacts with the Headquarters Station G3BZU count double (2) points per band. Contacts after 1st October, 1960.

A fee of 1/6 or six I.R.C's. (for foreign claims) will be made to cover costs. S.w.l.'s. are eligible to submit claims.

Claims, together with check list and QSL cards, plus fee, should be sent to R.N.A.R.S. Awards Manager (G3HZL), 153 Worple Road, Isleworth, Middlesex, England.

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IGNITION NOISE v. FREQUENCY*

IRWIN MATH, WA2NDM

Due to the increasing interest in mobile communications by Amateurs, it was felt that an investigation of the frequency distribution of the r.f. energy radiated from the ignition system of automobiles would prove useful both to the Amateur contemplating mobile operation and the Amateur already engaged in this phase of the hobby.

Tests were conducted between the frequencies of 2-150 Mc., thus encompassing the 80 through 2 metre bands. For those frequencies between 2 and 30 Mc., a Hallicrafters SX-100 was used and for frequencies above, a Civil Patrol 30-50 Mc. receiver; a 6 metre converter; and a 100-156 Mc. converter all using the SX-100 as a tunable i.f.

In order to have some sort of reference, a Measurements Corporation No. 80 signal generator was used and all noise measured with respect to a 10 m.v. signal at the respective frequency. All readings were taken by a peak voltmeter placed across the receiver's voice coil leads, and were converted to db. of noise readings vs. frequencies.

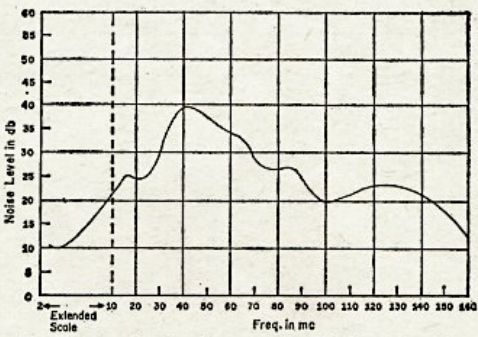

Fig. 1.—Graph showing results of study by the author of automobile ignition noise. Note peak between 30-45 Mc.

Antennae used were quarter wave whips above 30 Mc. and a 12 foot length of copper rod through a variable impedance matching device below 30 Mc. All antennae were placed where the whip antenna would normally be and vertically polarised. With horizontal polarisation of the pick-up antenna, results followed very closely but with somewhat lower noise amplitude.

The auto used was not equipped with ignition suppression devices. Unfortunately, one that was so equipped was not available and thus could not be tested.

The maximum value of ignition interference seemed to centre around 30-45 Mc. In fact at about 40 Mc. noise was about 30-40 db. above any other frequency examined. This would indicate why equipment such as six metre transceivers are so plagued with ignition interference. ●

* Reprinted from "CQ," August 1963.

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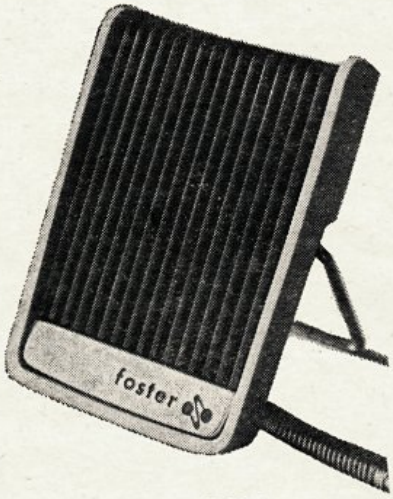

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Sub-Editor: A. H. BEHENNA, VK5BB,
36 Stanley Street, Crystal Brook, South Aus.
ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB EDITOR

A request for the condensing of DX Notes in "A.R." (as appeared in March issue) will mean the curtailing of trivial chatter, and only notes of actual workings, reception, and movements of importance can actually be included now in this column. All those who requested QTHs will be included where possible.

For those who do read these notes and take a genuine interest in them, would they please drop me a line to air their views on what they think should be included. The news placed herein is printed for these people, not for those who have no interest in it.

3.5 Mc.: Contacts on s.s.b. are possible, depending on static, and quite a deal of c.w. DX contacts are being partaken.

7 Mc.: Pile-ups on s.s.b. have to be heard to be believed between VK and G land. The efficiency of this mode of transmission is borne out by the mobile contacts. W contacts on 7.2 are there most evenings our time. Quite good signals from W, VE, KH, KW, KJ, etc. For those who have not listened previously, try 0730z 1030z daily. C.w. contacts go on regardless.

14 Mc.: All islands, etc., to the north are a pretty good bet nightly, while KL7 to KC4 can be had, provided a little patience is shown, this includes all modes of transmission. The average run of the mill contacts, viz. Malaysia through AP2, 1, to the continent are workable although the scarce ones are a little harder to obtain.

21 Mc.: Signals on this band, although not strong, are being effected greatly by QSB. Early mornings bring JA, DU, KR6 and some days about six or seven of the constant W stations. Most of these are a.m. transmissions, and are about strength 6-8 average, but they are workable. A few s.s.b. sigs, but most of these interested only in handling phone traffic. C.w. activity not very high here. Those interested should try 0000z-0200z, there is then a break of about three hours until the JA, DU, etc., stations break through again. This also depends on conditions, but on week-ends activity is naturally higher.

28 Mc.: Nothing heard here and no reports of activity whatsoever.

REQUESTED QTHs

EA3JE—Luis Parellada Roig, Puignovell 15, Tarrasa, Barna.
W6HYG—Albert De Young, 1011 Tam Oshanter Drive, Bakersfield, Cal.
FA2VD—Jean Navard, Palat, Tiaret, Oran.
G3MAN—D. Hornsey, 32 Shirley Rd., Rushden, Northants.
OA4CY—Julio Martinichin, P.O. Box 120, Calla, Callao.
DJ6MY—Manfred Schoberth, Ulmenstr. 13, 13a Nuernberg.
VE3CLH—H. Sharpe, R.R.4, Kingston, Ontario.
ZS1E—J. R. Pitts, C/o. P.O. Box 664, Cape Town, C.P.
3A2BY—Yvette Jaquenoud, 4 ru edes Roses, Monte Carlo.
4S7TX—W. A. Blain, C/o. Milk Board, Nahahenpita.
VP1SJC—Saint John's College, Landivar, Belize.
PY3BC—Romuld de Araujo, P.O. Box 82, Livramento, R.S.
OZ7VB—V. Blaugsted, Stenlandsvej 8, Copenhagen S.
KG6AHN—Jose P. San Nicolas, Yigo, Agana, Guam.
KP4AMP—Jose E. Polanco, P.O. Box 906, Cagaus.
KR6DO—Commanding Officer, 623rd A.C. & W. Sqdn., A.P.O. 235, San Francisco, Cal.
JA6AT—Yasumasa Arima, 3533 Nakana Yoshiri Shishhuku, Kogoshima, J.
JA3RB—M. Tsukamoto, 4-131 Tomei, Mikage, H. Nada, Kobe, Japan.
HS1B—A. L. Williams, P.O. Box 1038, Bangkok.
YA1BW—Via DL8AX.
CX5CE—H. L. Matturro, P.O. Box 37, Montevideo, Montevideo.
CR7GF—812 Lourenco, Marques Mozambique.
HS1I—P.O. Box 2008, Bangkok.
YA1AN—Via DL3AR.

RECENT DX WORKINGS

From Launce 5LD, all on c.w. 3.5 Mc.: W2FYT, W6OXJ, W6GTI, UA1KAG, UW9DA. 7 Mc.: LZ1KDZ, UAs, UBs, 2030-2100z. 14 Mc.: ZS5QU 1045z, EP2BP 1430z, YA1BW 1500z, W5HJ/KJ6 0730z, CR8AD 0830z, CE0ZI 0940z, VS1-6, UA, UM, UQ, OH, SP, SM, OZ, DU, 0830-1330z.

From Ken 3TL, on 14 Mc.: XW8AW/BY, AP5HQ, CT1VB, FO8AQ, GI3OLJ, GM3XO, LU8DLK, MP4BQF, ZS6BL, UH8BO, all on c.w. XW8AW/BY, CR7GF, CX3AA, HC2JT, HS1I, KG6IF (Marcus), LU8FAO, PY4BEX, UO5PK, YA1AN, all on phone. Best QSLs received: CN8BB, EA3NI, HZ2AMS, MP4QBG, VP7BG.

From L5065 and L3138. 3.5 Mc.: HB1ZV, many ZLs and Ws. 7 Mc.: W4ZK, W6RW, W4MZJ, G5JZ, G8AB, G3PIT, 9M2DQ. 14 Mc.: XZ2KN, 9M2AE, KZ5, VK4JQ, XW8AL, VK0PK, VR2, VR4, F, EA3JE, KW6, K5, KG6, G3, KX6, YV5, KP4, G8, KR6, ZS2MC, CX4AAM, HL9KR, KC4, SM3, UA, KB6, OZ5BW, DL0STP, 9N1BG, CR8BB, GM2, GI3, DJ0, SP5AR, CR9AI, I1TMG, TI2BW, KL7, VE7, SM7. 21 Mc.: JA4ATF, UA6ND, DJ4YG, W6YPZ, GM3PQG, KR6BF, VS4RS.

With these impressive lists we see that sigs are coming our way. Get with it. It can be yours.

This month I have tried to give an outline of all band habits for those who cannot hear their favourite country when they switch on the receiver. On 14 and 21 Mc. a directive array is a must these days for satisfactory QSOing. Special thanks again to the contributors of lists and thanks to those who wrote wishing me well in regard to the column.

73, Bert VK5BB.

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK5MS	24	306	VK6KW	4	211
VK5AB	45	301	VK3WL	14	211
VK6RU	2	297	VK2JZ	61	208
VK6MK	43	294	VK3ATN	26	204
VK3AHO	51	283	VK4HR	12	192
VK4FJ	21	270	VK4RW	23	186
Amendment:					
VK3TL	62	152	VK7LZ	36	136

C.W.

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK3KB	10	320	VK2AGH	71	259
VK3CX	26	303	VK3ARX	66	236
VK2QL	5	301	VK3AHQ	79	235
VK4FJ	29	291	VK3XB	75	233
VK3NC	19	282	VK5RX	23	230
VK6RU	18	259	VK3RP	56	229
Amendments:					
VK7LZ	17	229	VK2APK	76	199
VK3RJ	42	217	VK3TL	78	165

OPEN

Call	Cer. No.	C'nt-ries	Call	Cer. No.	C'nt-ries
VK6RU	8	304	VK3NC	77	283
VK2ACX	6	300	VK3HG	3	269
VK4FJ	32	299	VK3JA	43	252
VK2AGH	83	293	VK7LZ	23	242
VK6MK	74	292	VK4HR	7	233
VK3AHO	76	284	VK3BZ	4	231
Amendments:					
VK2VN	18	222	VK3TL	85	200
VK2APK	82	208			

S W L

Sub-Editor: Ian Woodman, WIA-L3006

The only news received from the various Divisions this month comes from VK2 and VK3, again nothing heard from the other areas.

VICTORIA

The Group is now having large attendances at all the functions arranged for the members. Remember the radio constructional evenings on the second Friday of the month and general meeting the last Friday of the month. During April the Group visited the Institute of Archaeology and the Volkswagen motor factory. For details of further visits, listen to VK3WI.

It has been reported that Graham L3118 may have his converter operating on 53 Mc. soon. Mac L3074 may be shifting to VK2. Robert L3076 looks like a beatle and Greg L3138 has had QSLs from KX6, KA2, VS6, VR1, OH5, ZE7, DU7, VR4, VE5 and GM3.

NEW SOUTH WALES

Oscar Project Co-ordinator, VK2HO, wishes to thank s.w.l's. who participated in Oscar II. project and reminds all s.w.l's. with gear capable of tuning 145.9 Mc. to be ready for Oscar III., possibly during July or August. Listen to your Sunday broadcast for details and you may be the proud possessor of an Oscar QSL card.

The monthly meeting is being well attended and even more members are wanted to join in the discussion which will assist you in your hobby. See you on the third Friday of each month. President Sid L2258 has supplied the circuit of a small simple and cheap b.f.o. which can be added to your existing set. A request for this circuit and/or the Aerial Book plus the stamp to cover postage will be available to all.

Thanks to the fellows who write and so assist me with these notes. Keith L2269 uses an 1155 rx and may be able to supply some DX soon. Sid L2258 has logged KW6, 9M2, DJ0, KC4, XW8, VS4 and BV1 between prawning and fishing whilst on holidays. Did he catch as many fish as stations? Don L2022 has offered me the loan of a book on S.w.l. Awards. I hope to let you know of them soon. Ross VK4/L2233 has logged ZL, W4 and LU9 and compiled 425 points in the N.F.D. Contest.

An impressive list of countries was received from Russell L2262. We all feel as you do re the lack of return QSL cards. Noel Black and George Barnes are newcomers to the column. Noel has an AR8, B28 and 1155 rx —good for some DX in future. George has obtained an AMR101 for his DX listening.

The Voice of the Andes beams to the South Pacific daily at 0130 to 0500 E.A.S.T. on the 25, 31 and 49 metre bands. 73, Chas L2211.

WESTERN AUSTRALIA

Peter Drew, the lone voice from VK6, reports he received many cards including FV0, YV5, EG7, GM3, HZ2, MP4, UG6, ZD7, KP4 and YO6. I hope your new r.f. pre-amp. brings in DX and that the night school still enables you time to listen.

DX LADDER

	Countries Conf.	Countries Hrd.	Zns. Conf.	S.s.b. Conf.	S.s.b. Hrd.	W Stat.
E. Trebilcock	282	289	40	—	—	50
D. Grantley	113	274	38	20	104	35
A. Westcott	93	159	31	9	107	11
M. Hilliard	84	285	33	34	168	12
P. Drew	94	237	30	44	200	27
M. Cox	80	232	31	49	163	21
C. Aberneathy	58	100	31	—	—	—
G. Earl	52	150	26	32	127	6
N. Harrison	44	119	29	4	20	35
I. Thomas	42	139	20	16	97	14
R. Oats	9	26	8	—	—	—

YOUTH RADIO CLUBS

And now the girls are getting into the act! Susan Brown (age 17), a prominent member for some time in Keith Howard's fine club at Booragul High, passed full A.O.C.P. recently—first school-girl to do so as far as I know. Sorry I have no details about Susan, but this event opens up other possibilities. There is every reason, in this modern world, for girls to have the same scientific training as boys. There is also the news that Phillip Lowe, of Epping High (Sydney), is the first of the non-clubbers to pass Limited A.O.C.P. (Phillip has a traineeship with Telephone and Electronic Industries.) This is an excellent effort without club help.

Y.R.C's. have had a bad blow from staff changes in High Schools—Keith Howard from Booragul to Cook's Hill, Lee Kinsella to Wollongong, Ralph Catchell from Homebush to Moorfield, and at least three others in VK2. Enthusiastic support from the Division and Amateurs generally would mean that this merely breeds extra Y.R.C's., but lack of this support means that these existing clubs may disappear and the transferred leaders have to build up again. Any rescuers for these clubs? Keith has started a non-school club near Booragul—can anyone beat the extraordinary donation of a 1950 Humber and rent-free premises to Keith's club?

We're still spreading. New Guinea will soon be with us. The Science Master at Port Moresby High School is an ex-VK2 teacher, Mr. W. Strang. The Headmaster is keen also and there is a good list of potential club members. Can any VK9 Amateurs assist?

We're fortunate in finding a live personality in VK4 to take over when Stan's ill-health made it necessary. He is Chas. Taylor, VK4UC (Uncle Charlie to the grateful kids of VK4), teaching at Clontarf Bay High, near Brisbane, and making the Redcliffe Peninsula and its schools a real Y.R.C. stronghold. With some help from Rotary (have you club leaders tried your organisations such as Rotary, Apex, Lions, etc.?), the Taylor drive and the goodwill of the De La Salle brothers, the Peninsula may have three Y.R.C. transmitting stations soon. Chas. shows great promise in the publicity field—more of that later.

We're also fortunate in VK3 (this is **not** the Southern Mouse!) where Ken Matchett keeps his organisation running well. His Newsletter No. 8 gives news and advice to leaders. John Ross (Country Fire Authority) has offered help at Warrnambool Radio Club, and Ray Ellis (3ZDE) at Gowrie Park. VK3 has five transmitting clubs—Australian Postal Institute (3ZTI), Morwell High (3ANL), 8th Footscray Boy Scouts (3AEF), Scotch College (3ZKY), and Gowrie Park State School (3AYM).

Prizes offered are: In VK3, most active tx from April 6 to Dec. 1; in VK2, Australian Radio & T.V. College Scholarship (based on our Inter. Certificate), pennant for most Elementaries in 1964, pennant from I.R.E.E. for most efficient club in 1964 (points for various certificates); for all VK, the big Morse Code Contest, held about September (probably by timed tapes) in two divisions (under and over 15, ages on date of competition) proceeding from individual club champions through state champion to VK champion. How are your brass-pounders training?

Have you seen your local M.H.R. to press for 1/10 of 1 per cent. of Sir Robert's £5½ million as a cheap way of doing a great deal of good for Science in schools through Y.R.C's? 73, Ken 1KM.

NEW CALL SIGNS

JANUARY, 1964

VK2OZ—E. C. Hulme, 2 Alroy St., Bulli.
VK2QM—E. W. Bastow, 33 Essilia St., Collaroy Plateau.
VK2TR—R. A. Taylor, 36 Auckland St., Bega.
VK2ZM—N. M. Nicholson, 36 Carnegie St., Auburn.
VK2ADV—C. M. Hicks, Steven St., Forster.
VK2AQU—F. Avent, Presbyterian Manse, 18 Payten St., Ryde.
VK2AXN—K. P. Karkkainen, 14 Foord Ave., Hurlstone Park.
VK2AXO—Woronora Radio Club, C/o. Post Office, Sutherland.
VK2AXS—M. C. Swinton (Mrs.), Station: Oil Bore Rd., Kulnura; Postal: P.O. Box 1.
VK2AZE—G. R. Stewart, 212 Prince Charles Pde., Kurnell.
VK2ZES—H. E. Stephens, Sibley St., Nimbin.
VK3EO—G. Edsall, 3 Ruthven St., Macleod West.
VK3ZX—H. M. Everett, 29 Sunnyside Ave., Horsham.
VK3AJC—J. R. Edwards, Lot 197, Golconda Ave., Frankston.
VK3ZAZ—I. J. Zmood, 1 Wrixon Ave., East Brighton.
VK3ZAX—W. L. Day, 103 Commercial St., Kaniva.
VK3ZCL—J. J. Chistensen ,19 Beckett St., Chadstone.
VK3ZEJ—R. E. Jordan, 36 Gale St., North Aspendale.
VK3ZHG—G. R. Hovey, 132 Loch St., Maryborough.
VK3ZLA/T—L. J. Kelly, 26 Cambridge St., Belmont, Geelong.
VK3ZRV—J. C. Weir, 57 Wilford Rd., East Ivanhoe.
VK4CA—A. W. Carter, 101 Francis St., Townsville.
VK4JI—J. S. Beckingham, 33 McLean St., Goondiwindi.
VK4QD—J. H. Garrett, Station: 31 Kurilpa St., West End, Brisbane; Postal: C/o. C. I. Patterson, 384 Figtree Pocket Rd., Figtree Pocket, Brisbane.
VK4QS—V. B. Aldrich, The River House, Lamington St., New Farm, Brisbane.
VK4ZES—J. E. Spencer, Ann St., Woombye.
VK4ZLI—J. T. F. Linde, 47 MacAllister St., Park Avenue, Rockhampton.
VK5SE—J. L. Schuler, 52 Finnis St., North Adelaide.
VK5ZDJ—C. Winkler, 4 Regent St., North Glenelg.
VK5ZKV—W. Blackburn, 78 Allinga Ave., Glenunga.
VK6ZEC—D. F. J. Benck, 46 Green Ave., Tuart Hill.

☆

CONGRATULATIONS

Hearty congratulations are extended to Geoff Morris (WIA-L3017), who, although blind, recently succeeded in gaining his Bachelor of Laws (Ll.B.) degree. Geoff has always been a keen S.w.l. and hopes some day to gain a licence to allow him to operate fully on the air.

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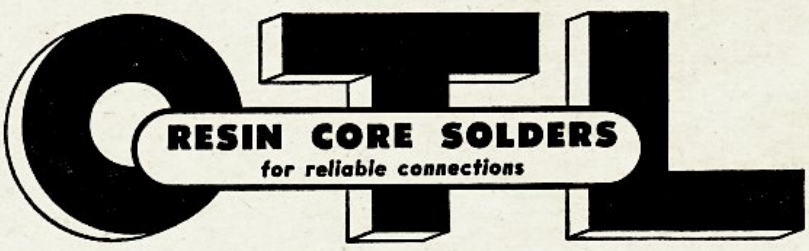

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SIX METRES AND ROSS HULL CONTEST

Editor "A.R.," Dear Sir,

One could quite conceivably have been excused from taking a second look at the cover of "A.R." for April to make sure it was "A.R." and not the old English magazine "Punch" or similar upon commencing to read "How to Win a Contest" by Adrian Rofe (VK2HE). At £13 for a page in "A.R." Dr. Rofe has done his best to leave a literary impression. The greatest risk I find in commenting on the article, and the letter by the same author in the previous issue, is that I might become too personal. I shall try not to be.

Dr. Rofe believes "the spectator knows far more about the game than the players." This is a common erroneous idea—prove it by listening to the comments and heckling from the boundary given to football umpires by all and sundry—the game would surely be "improved" if the man in control heeded all the advice and abuse hurled at him. This same attitude of the bystander knowing better is further exemplified in cricket—look at the advice cricket umpires receive from English newspaper writers and critics. So we may go on ad infinitum . . . No Sir, generally speaking, those who participate in activities of any sort, and have the right frame of mind, are those most likely to succeed, whatever the field involved.

If I may be permitted the temerity to offer any advice I would say this. DX openings on 6 metres, as most know, have to be heard to be believed. When signals of even a few watts can be heard from a 1,000 miles or more at S9, and a band is open to all States as it was on Boxing Day, it is inevitable QRM will follow. In more than 25 years of listening it would be rare for the h.f. bands to ever approach 6 metres for quantity of massively strong signals at this QTH, which is a first rate short wave reception area. Notwithstanding, the h.f. bands can have their share of QRM—one only needs to listen to the 40 metre W section late in the afternoon to hear QRM.

Band conditions 10 years ago on 6 metres were a vastly different thing from today. There are many more signals, more powerful transmitters, large beam antennae, etc., but unless one has a receiver in keeping with the changed conditions, all manner of troubles will manifest themselves on a crowded band. The cross modulation and front-end overload characteristics of a receiver are of vital importance today. I have a converter of 1950 vintage, which has performed well in the past, but will not live with the new converter I made last year—could this be some of the trouble at VK2HE? Some time spent on the above two characteristics alone by anyone is time well spent.

To say only 300 kc. of the band is used is not entirely correct. Many of my own contacts this year were made by tuning from the 51 Mc. end down, and my transmitting frequency for much of the time was 50.42, and quite a few contacts were made when operating around 50.85. One has to be fair, however, and agree that crowding was certainly evident on the low end, where probably 60 to 70 per cent. of signals were operating, 20 per cent. in the next 200 kc. and the remainder above. Nevertheless, I must say very little difficulty was met here trying to work anyone selected at any time. I also cannot agree on the statement that names were not bothered about or given incorrectly. I was amazed how readily 99 per cent. of the 500 odd DX contacts made this year answered me by name when contact was made a second or subsequent time. This to me is one of the fine things about Amateur Radio—to be greeted with your Christian name from the other end, and I found this state of affairs almost without exception.

There seems little else of value to comment upon in either the letter or the article. Obviously the good Doctor is dangling bait on a line in the hope of catching something or someone. However, it is so easy for anyone to offer criticism but what makes a person stand out from others is to offer criticism constructively. I do say improvements could be made to the Ross Hull Contest, and suggest the following could be given consideration by those in authority.

1. In an effort to keep v.h.f. activity at a peak for as long as possible, the contest be continued for the month as at present.
2. Competitors be required to return their full operating log, but to indicate thereon their best seven days of scoring. A summary of the seven daily totals attached to the completed sheets would aid the Contest Committee. By the best seven days method:
   (a) Those having a shorter period than one month in which to operate could enter and have a reasonable chance of getting somewhere if they wished to really try.
   (b) Allow a competitor to enjoy Xmas with the rest of the family and not seriously affect his log. (This overcomes one of Dr. Rofe's objections.) It would also allow the competitor to break away and join in other family and community activities, and to take that "long needed bath!"
3. Intrastate contacts under 50 miles not to be permitted for scoring purposes—this would alleviate to some extent some local QRM and help the Interstate fellow.
4. State awards as well as individual awards to be created and so try to obtain a greater percentage of logs returned to the Committee—this in turn will keep band activity high—and that's the surest way I know to help keep our already small allocations intact longer.

Summarising the whole issue, (i) Dr. Rofe could have done better spending as much time on constructive criticism. (ii) Some time spent on adjustment to receiving equipment appears justified. (iii) It is as well to also adjust oneself to the different conditions prevailing on v.h.f. bands during a DX opening as compared to h.f. bands. (iv) An open tolerant attitude to all and sundry can be a blessing when the going starts to become rough. (v) Experience is a great teacher, and some time spent on DX openings prior to the contest, conditions one on what to expect, and one is better able to cope with difficult situations should they arise. (vi) More general use of the v.h.f. bands by ALL Amateurs would do much to spread knowledge and thereby tend to make us all just that little better—some Amateurs have never heard of a QQE03/20 !

Finally, Dr. Rofe, I did quite enjoy reading your satire, which I expect it was really meant to be. I do only hope it was written in the right frame of mind and not with malice of forethought. See you on 6 metres next DX season.

—E. C. Jamieson, VK5ZEJ.

AWARDS FOR S.W.L's.

Editor "A.R.," Dear Sir,

In March "A.R." I read with interest of the new V.h.f. Award, H.A.S., and as I have the necessary requirements I thought this may be available to s.w.l's. I wrote to the Awards Manager, who in reply said, I quote: "Sorry, there is no provision for this in the rules."

Can anyone tell me why s.w.l's. are not catered for in the awards issued by the W.I.A.? On checking the latest Call Book I find some 326 listeners listed plus those whose names do not appear, make quite a good contribution towards the W.I.A., and I feel that associate members should not be by-passed, but considered when the award rules are being made.

May I repeat what I wrote in "A.R." (April 1963), New Zealand has made it possible, so why not give a thought to S.w.l. Awards in Australia.

—Chas. Aberneathy, WIA-L2211.

VHF

Sub-Editor: Len Poynter, VK3ZGP.

Once again these notes are somewhat sketchy due to non arrival of Interstate notes. However I hope my pleas will not fall on deaf ears. The move on 6 mx has now been made and Channel 0 has made its appearance with test transmissions. It is of course putting in a paralytic signal at this QTH. Hope all States will be able to hear our king size beacon when the band is open.

The VK3 net frequency on 53.032 Mc. is gaining new adherents each week. Some 40 odd calls have been heard in and around Melbourne. Equipment ranges from 2w. Reporter units, both fixed and mobile, up to 150 watters. Vertical polarisation is in, with coaxials and ground planes appearing amongst the beams.

On 52.525 Mc. the f.m. net is building slowly with some six stations having been heard. Quite a few are planning n.b.f.m. transmitters in the hope that it might help. I believe that the VK2 V.h.f. Group sponsored a special newsletter on f.m. for v.h.f. and would appreciate if someone from that Division would forward me a copy for our information.

If you go mobile in VK3 on 6 mx, remember the 53.032 Mc. frequency, 52.525 Mc. f.m. and 145.85 Mc. f.m. are in use here. We hope that other States might make use of these frequencies, particularly the 6 mx channels and perhaps be able to keep a close watch on the band by using them.

Two metre DX between VK5-VK3 and VK7-VK3 has been quite good during the past month with good openings on quite a number of days with good signals both ways.

With the VK3 Sunday broadcast through 3WI at 8 p.m. on 80 mx and 2 mx, news of VK3 v.h.f. activity should be audible in most States. Keep listening for items of interest.

Please keep your reports coming in before the 1st of each month and help fill up this space. 73, 3ZGP.

WESTERN AUSTRALIA

At the time these notes are being written the losing of the 50-52 Mc. band is only a matter of days away and unofficial plans are in hand for a "small" celebration during the last hours on 50 Mc. As regards activity on 52 Mc. in VK6, it appears that the main activity will be between 52 and 52.5 Mc. with the VK6 beacon on 52.006 Mc. It is proposed to set aside 52.2 Mc. for a common calling and mobile frequency and arrangements are to hand to obtain supplies of suitable crystals.

While on the subject of 6 metres, I would like to welcome back Wally 6AG to the v.h.f. bands and also to welcome newcomers Don 6ZEC, Roy 6ZBD and Graeme 6ZEZ.

I don't know whether anyone from other States reads these notes, but I would like to stake a claim on behalf of the VK6 boys for the first fox hunt on 432 Mc. (actual frequency was 435 Mc.). If anyone can refute this claim then all I can say is, congratulations to you. The hunt took place on 21st March and was run by Charles 6LK and Rod 6ZDS, using a 432 Mc. tx running about 15w. input. By de-tuning the transmitting balun, enough (?) radiation was emitted on 145 Mc. to allow those without 432 Mc. converters to participate. The roll-up was poorer than usual, with seven cars taking part, three on 435 Mc. and four on 145 Mc. However, it is interesting to note that the first two to find the fox were using 435 Mc. gear (probably due to the stronger signal on this band).

Several of the members have bought "new" cars recently, these include 6ZDO, 6ZBT and 6ZDW (I wonder why Doug. bought a panel van?). Also it is rumoured that Colin is thinking of buying a new 179 M. 73, 6ZDB.

TASMANIA

The 1964 Athol Johnson Memorial Contest was held over the week-end 29th Feb., 1st March, and was won by Kevin 7ZAH; runner-up was 7RL. This annual contest is to promote v.h.f. and u.h.f. activity; particularly portable and mobile, within VK7. This, the fifth contest, was the most successful to date, since the activity was spread over a greater area of the State than in previous years.

432 Mc.: This band has few takers in VK7 at the moment. The only contact reported so far was between 7RL and 7LZ, both in Launceston. No activity in the south so far, although gear is under construction.

144 Mc.: Activity is being maintained at a good level throughout the State. Quite a bit of DX has been worked from North and North-West Tasmania the past few months, although conditions have not been as good as previous years. Best openings so far have been on 13th Jan., 28th Feb., and 27th and 28th March. Unfortunately no DX has been worked from Southern VK7 this year, although an inversion was noted in Hobart from 26th to 28th Feb. During this time GTV9 and HSV7 were received at viewable levels by 7ZAP at the elevated Hobart suburb of Mt. Nelson—but no 2 mx DX.

50 Mc.: Nothing of note to report on. No doubt everyone is preparing to move to 52 Mc. 73, 7ZAQ.

FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

FEDERAL QSL BUREAU

FO8AQ requests that all QSLs be sent to him direct and **not** to FO8AA.

We regret to learn of the tragic loss sustained by Bud Shultz, W6CG, well known to VK c.w. and r.t.t.y. stations, when on March 18 his wife Mary was killed in an auto accident. The circumstances are even more distressing. Mrs. Shultz was driving along a freeway when a get-away car driven by hold-up men hotly pursued by police and travelling at high speed ran into the rear of her vehicle. Bud learned of his loss in the course of his duty at the local b.c. station when compiling a news bulletin. We mourn with you, Bud.

Rules for the annual SP International DX Contest arrived too late for prior publication. The Contest was held on 11th and 12th April. Rules were similar to previous years and logs are due by 31st May. Full details from this Bureau.

Rules for the 1964 P.A.C.C. Contest staged by the Netherlands section of the I.A.R.U. also arrived too late for prior publication. This Contest was held from April 25 to April 26. Logs must be postmarked not later than June 15. Further details from this Bureau.

After seven years as VK2 Inwards QSL Manager, Frank Hine (VK2QL) has surrendered the appointment due to a restrictive indisposition. We trust the ailment will yield to the more intensive treatment that Frank will now be able to undergo. His successor is VK2SG.

In the E.D.R. 13th OZ-C.C.A. Contest Amateurs will try to work Amateur Stations in all continents. The following Amateur bands may be used in both c.w. and phone: 3.5, 7, 14, 21 and 28 Mc. Dates—C.w.: 1200 G.M.T., Saturday, May 2, to 2400 G.M.T., Sunday, May 3. Phone: 1200 G.M.T., Saturday, May 16, to 2400 G.M.T., Sunday, May 17. C.w. contestants will exchange six-figure numbers consisting of an RST report plus the number of QSO starting with 001. Phone contestants will exchange five-figure numbers consisting of RS report plus the QSO number. Three points for each QSO. OX, OY and OZ contacts count 6 points. Every country worked counts as a multiplier, and the final multiplier is the sum of all countries worked on each band. Each of the W/K, VE, PY, LU, VK and ZL licensing areas count as separate countries. Final score: Contestants multiply the total QSO points by the sum of multipliers. Logs are to be sent to E.D.R. Contest Committee, P.O. Box 335, Aalborg, Denmark, with usual certificate to be mailed by June 15, 1964. Suitable certificates will be awarded for c.w. and phone to the Amateurs attaining the highest score in each country.

—Ray Jones, VK3RJ, Manager.

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FEDERAL AWARDS

The following awards have been made since 6th February, 1964:—

W.I.A. 50 Mc. W.A.S.:

Call	Cert. No.	Addt. Cntrs.
VK6ZCM	53	–
VK3ZIG	54	1
VK4ZK	55	3
VK4ZEK	56	1
VK1VP	57	2
VK4ZAL	58	2
VK8ZCX	59	–
VK6ZDS	60	1
VK5KK	61	3
VK6ZAS	62	–
VK5ZGF	63	3
VK5WV	64	1
VK6BE	65	1
Correction:		
VK4ZLG	49	2

V.H.F.C.C.:

VK5KK	28	50 Mc.

W.A.V.K.C.A.:

VR1G	253
UA0EH	254
W0AUB	255

—A. Kissick, VK3KB, Manager.

— . . . —

NEW SOUTH WALES

HUNTER BRANCH

The main cause for jubilation this month is the success of three candidates who sat for the January A.O.C.P. exam. Two, Susan Brown and Jan Oosterveen, passed for the full ticket while Ross Beckley passed for the Limited. In passing the exam., Susan, who is 17 and a pupil of Booragul High School, becomes the first schoolgirl in Australia to qualify for the A.O.C.P. Susan says she will be unable to devote much time to Amateur Radio this year since her final examinations are in November, but she does hope to get on the air sometimes and is especially interested in c.w. contacts. Jan, who has just completed three years at the same school as Susan, is now a technician in training with the Post Office. By the generosity of some local Amateurs, he already has equipment ready in Sydney and at his home in Awaba to go on the air as soon as the coveted ticket arrives. Ross hopes to do his Morse test before the end of the year and complete the requirements for the full ticket.

Meantime those who were not so fortunate are saddling up again and really aim to get the examiners beaten this time. All the candidates are members of the Westlakes Radio Club, Teralba, where renovations are going on apace both in the classroom and the operating room and workshop. It is hoped that this club will extend further the activities of the Youth Radio Scheme in the Lakeside area and provide some more examination material in the future.

After a long career in the Post Office, Toronto's brass pounding postmaster, Jack 2KQ, has retired and was given a send off party during the month. Jack has been on the air quite frequently in recent weeks, on c.w., and has had some pretty good signal reports from Paddy 2AXU, who is all of 400 yards away. The old gentleman of Phenyle Bay, Bill 2ZL, and his little buddy Bob 2AQR have journeyed forth to distant places north, north-west and coastwise, paying visits to their many Amateur friends in these areas. Geoff 2VU is much more active of late and has been heard training the junior op.

Frank 2APO has found a 160 metre rx and now has no troubles whatever with the Monday night broadcast although he has caused some strife by overloading Gordon's rx at 2ZSG. The local boys got among the prizes at the recent conventions and Ian 2ZIF, Les 2RJ and Stan 2AYL all came home with happy smiling faces. Les was especially jubilant since he scored twice and Sylvia the XYL won the lucky number. Had there been a baby show then the new junior would undoubtedly taken that off as well.

Your scribe took himself off to Adelaide at Easter with the express intention of meeting Pansy, but the VK5 boys had hidden him away in a safe place. There is current rumour in the Cessnock district that that intrepid grid modulation man, Sherwood, has given Amateur Radio away in favour of photography. We can only hope that Chris and his merry men will put him back on the right track so that he may keep the promise to be on by 1970. The really consistent operators in the branch area are the 2 mx chaps who are keeping Newcastle on the v.h.f. map. Des also is still finding time to improve the 432 Mc. gear and go to work as well. Rumour has it that one of our executive officers is moving to the choicest DX spot in the country where there is only one other active Amateur, so keep your ears tuned for an even bigger signal than usual from this senior gentleman.

Since there was no meeting this month before the notes were prepared, a report of the April and May meetings will appear in the next issue. Because of illness, the lecturer set down for the April meeting, Les 2ZBJ, was unable to attend and his talk of "Receiver

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Front Ends" has been postponed until the May meeting. This will take place in room 15, classroom block, Newcastle Technical College, Tighes Hill, at 8 p.m. on Friday, 1st May.

Negotiations are in progress with the College to have a bigger room allocated for meetings as the members have outgrown room 15 with only 40 chairs. Please listen for last minute changes to the room number on the Monday night broadcast. The broadcast is transmitted on 1820 and 3595 kc. and relayed on 144.4 Mc. by Gordon 2ZSG. The news originates from 2AWX, the official station, and call-backs following the session are welcomed. For those who don't know, it commences each Monday evening at 7 p.m. E.S.T.

In addition to the lecture at each meeting, there will be some other entertainment, but you'll have to be early, as they commence on the dot at 8. So try to make it, you are sure to enjoy yourself. 73, 2AKX.

CANBERRA EASTER CONVENTION

Over the Easter week-end, in beautiful sunny weather, the Canberra Radio Society organised a Convention with a difference. Since Canberra has so much to offer the tourist and has so many centres of great scientific interest, it was arranged that visitors could have Amateur Radio, tourism, and interesting visits in any proportion they wanted.

The travelling time on Friday was enlivened with a Mobile Contest (won by Vic 2VL). The club rooms were full of radio talk on Friday night. The delightful Cotter Dam area was the venue for a picnic lunch on Saturday, and there the tough Receiver Sensitivity Contest was held. Competitors were given a 5/5 signal to start with and the power was reduced after each code group of letters and numbers was given by voice. The winner was Bruce 3QC who received five correct groups out of ten. Any receiver and any antenna was allowed. Are there any brave contestants in 1965? (No tall yarns count!) A V.h.f. Hidden Tx Hunt (won by Phil 2ZPI) brought some back to the club rooms, but some prolonged their picnic in delightful surroundings. That night a dinner was held.

On Sunday morning, there was a most interesting visit to the Australian National University Nuclear Physics Dept., where Tony 1SG showed a fascinated group the Van der Graaf and the Tandem Accelerator. Tony works on these monsters and was so able in his exposition that 7,500,000 volts and its effects on a nucleus, not to mention a remarkable complex of machinery and instruments, seemed less of a mystery. Sunday afternoon was occupied with a V.h.f. Hidden Tx Hunt (won by John 2EZ), an All-Band Scramble (won by Frank 2ACQ) and a visit to Mt. Stromlo Observatory. That night, there was a social evening with prize-giving and a film on "Single Sideband". With prizes and free samples from McGraths, A.W.A., A.W.V., Ducon, I.R.C., Willis, Cunningham and A & R, everyone made a good profit.

On Monday morning there was a special visit to the Navy Tx at Belconnen. The problems of using **several hundred thousand watts** kept the questions flying. There was much interest in two-tone morse, teletype, frequency shift keying, banks of frequency synthesisers, hundreds of acres of buried radials, a large farm of rhombics, log-aperiodics, gigantic dipoles, and a final tank coil the size of which you wouldn't believe. We acquired a Naval addition to our code—ZFO (F for finger, O for out). A pleasant session in the Officers' Mess rounded off an eye-opening two hours.

This was the first Convention of its type in Canberra. The numbers were not large (about 40 attended, not including XYLs), but nevertheless the C.R.S. will provide in 1965 a programme even more extensive and feels confident of increased numbers. There will be h.f. and v.h.f. tx and fox hunts, mobile scrambles, the new rx sensitivity contest, at least one special event for single sidebanders, and visits to a selection from A.N.U. nuclear physics, Mt. Stromlo Observatory, Belconnen, and the new Mills Cross Radio Telescope which will probably be operational by then. All the attractions of Canberra are available, too, as well as the Snowy Mountains Scheme. With such attractions for Amateurs, combined with separate tourism for XYLs and harmonics, the Society feels confident it has a new type of Convention. C.R.S. may have a small block of many types of accommodation available up to a month before next Easter, but it does not have the finances or manpower to take too much responsibility—it strongly suggests early booking, preferably many months ahead. A copy of the 1964 Information Sheet and Programme will be sent on receipt of a stamp. If you want a programme like the one outlined, let the C.R.S. know of your support.

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VICTORIA

WESTERN ZONE

There is very little to report at your scribe's QTH this month. Owing to the long day summer and the high noise level coming from the a.c. mains, signals are weak on most of the bands, but still manage to have 6 or 7 regulars on 80 mx for the zone hook-up each Wednesday evening.

One or two of our members are toying with the idea of attending the State Convention during the next few weeks, so we are looking forward to hearing a first-hand report on same.

About the only members active on the bands are 3AFU on 160, 6 and 2, and 3NN seems to be working a few on 2 mx. 73, Bert 3EF.

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QUEENSLAND

THE SUNSHINE STATE'S 1964 CONVENTION AT ALEXANDRA HEADLANDS

Cyclone Henrietta heading for the coast . . . 100 m.p.h. winds . . . devastation could be as great as . . . mountainous seas . . . heavy rain. What a forecast to have at the time the Convention was due to commence. Did it deter anyone? Not a chance—more than ever came to Alexandra Headlands to the best Convention yet. What of the weather? Two bad showers over the week-end.

This year's Convention differed from previous years in that the V.h.f. Group, who had been very active over Easter, in all the heavy rain, helping with the Boy Scouts' Easter venture, were not there in force with their usual hustle and bustle of cars and much activity with contests.

Instead there were more of the h.f. fraternity perhaps of a year or two older group who were content to go more quietly enjoying meeting old and new acquaintances. There seemed to be but time for four contest activities instead of the usual eight or ten. Perhaps Bob 4ZRC will have more assistance next year.

Of notable importance was the strong support from the Wide Bay and Burnett Branch who were lead by President Roy 4ZWR and Secretary Jocelyn 4JJ.

It is pleasing to note that the policy of encouraging members to bring their families is being appreciated as this year the space that had been made available for families was fully taxed so that next year when, so we are told, more members will be bringing their families, we will have to make another wing available. Where else can members with a family get such a low-priced pleasant week-end holiday?

Some dozen visitors arrived on Friday night and the aerial gang got into action soon after breakfast next morning, Saturday 4th, when two h.f. and a v.h.f. station were set up.

During the morning an all-band scramble, no holds barred, was held. After dinner the v.h.f. gang turned on a hidden tx hunt and the ladies arranged a visit to a potter's studio on Buderim Mt., where they spent a pleasant afternoon watching the potter demonstrating his art.

The Annual General Meeting was held at 4 p.m. when Pat 4KB gave a resume of the financial statement and his report of the past year's progress, which was received with acclamation. It was indeed a pleasure to have such a large proportion of country members at the meeting. Treasurer Keith 4DG and Lionel 4NS came up specially for the meeting.

Alf 4OL gave the 4WI Sunday morning news from the Convention at 0900 hours and was pleased to have about 20 call-backs. He gave such a glowing picture of the Convention that several members there and then set off for Alexandra Headlands.

Contest winners were as follows: All-Band Scramble (Sat.), Rod 2ACU; Hidden Tx Hunt, 1st Dane 4ZAX, 2nd Paul 9ZBV; All-Band Scramble (Sun.), Leigh 4RH; Most Distant Visitor, Paul 9ZBV; Best Home-Built Equipment, Ken Chiverton; Lucky Reg. Number, Paul 4VS, AR7 Rx; Raffle, AR7 Rx, Max 4HD; Lucky No., Ladies, Joan, XYL 4RZ, and Jean, XYL 2ALB, Shelly ware; also six children won prizes provided by Al 4LT. All radio contestants received a set of aligning tools in a pouch.

Exactly 100 registered, which was a good gain on last year and despite the reasonable charges we still made a gain financially, which augurs well for next year.

Thanks to our overworked organiser Bob 4ZRC, Jocelyn 4JJ and Marie, who were towers of strength in registering visitors and carrying out other tasks. Thanks also to our friends in Brisbane who helped with prizes and equipment which was really appreciated. See you there next year for sure. 73, 4PJ.

TOWSNVILLE AND DISTRICT

Gregg VR2BC (this morning 5/4/64) was quite perturbed, enquiring where Henreitta the cyclone had disappeared to after the last one (Gertie) from Sunny North Queensland had played havoc in Fiji. Then the dulcet tones of Ray 9RH came on and reported that it had lashed Norfolk Island in the wee small hours of this morning. Everything was wet and his temporary antenna still working. So Gregg was quite happy that it was not going his way. Amateur Radio still keeps the boys informed just what is happening.

Activity seems to be picking up around here as a few extra trying to punch through the noise level. Allan 4PS hard at it getting

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the 144 Mc. gear ready for the new satellite that promises great things in the way of DX on the v.h.f. bands, so it will be interesting to see just how things go. Merv 4ZMV shortly to arrive from the backblocks to our fair city on transfer. He should then be happy to try out all those wonderful and weird ideas that he has been dreaming up the last few years. So boys watch all those bits and pieces lying around, as he belongs to the emu totem that revels in this type of thing.

Basil 4ZW still hoping that Zoe will let him get that beaut receiver that is always being tried out in the shack. While Evie keeps Charlie 4BQ on his mettle in erecting antennae. Bert 4LB waiting arrival of choice part from Japan to improve the receiver. Vern 4LK made a welcome visit the other day; long time no see or hear. The boys from the Burdekin area seem to be hibernating for the winter very early as no r.f. from that direction after all those grand ideas of Claude's. Now that the Highway has by-passed my QTH, I miss those callers from the South. Why not make a detour, the kettle is always ready for a cuppa!

What has happened to the Capital City boys? No notes! Remember, the band is not always open on Sunday morning to copy the news. Where are all those scribes? 73, 4RW.

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TASMANIA

Well, another Annual General Meeting and Dinner have come and gone, and a successful "Do" it was, too. Our thanks go to the Northern Zone President (Denny 7DK) and his loyal band of helpers for a most enjoyable time. Forty odd members attended the meeting and 61 sat down to Dinner. The P.M.G's. Department was represented by Mr. W. Hollingsworth. There was a disappointing roll up from the N.W. Zone, but then no one night can suit everybody. Perhaps things will be better next year.

We had Brian 7ZBE (ex-VK0BE), complete with face fungus, with us for a few days after his return from Davis Base. He has now gone on to VK3 for some months before coming home again. Says he wants to go back for another term. Personally, I'd rather go north to the warmer climates.

Good news about our Athol Johnson Memorial Contest. It is at last on a State footing. Previous years it has been contested for only in the Southern Zone, but this year stations were active in all three zones and the perpetual trophy was won by Kevin 7ZAH; congratulations, Kevin. The battle will be on now to get it back down south.

Good to have a VK2 visitor in Albert 2ZFB among us at present and possibly for some time. Terry 7CT has started another A.O.C.P. course in the club rooms on Tuesday nights, and at present has eight starters.

The job of "Financial Wizard" has been filled by a "volunteer" in "Tiny" 7JD, the biggest man in the Division. I feel sure no one will argue with him when or if he pulls the purse strings tight.

VK5 is fortunate at present inasmuch as two of our Division's leading lights have been avisiting. Denny 7DK was over there on a fortnight's holiday, and Ted 7EJ represented us as Federal Councillor at the Easter Federal Convention.

Jack 7JB, who recently attended the Civil Defence Conference at Mt. Macedon, reports that there is a definite place for the Amateur operator in Civil Defence Communications, so it behoves us all to participate and make the Amateur Service mean "SERVICE".

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Joe 7BJ is soon to hibernate for the winter at his mountain bachelor's quarters and we hope that another interesting lecture on "Trends in Receiver Design" to conclude his series will be forthcoming before the snow sets in. 73, 7ZAS.

NORTHERN ZONE

Last month the Annual General Meeting and Dinner were held in the North. I won't go into the details of the business of the meeting, office bearers, etc., as, no doubt, our new State Correspondent will go into that. It is sufficient to say that a good time was had by all.

Congratulations to Reg 7RL for obtaining second place in the recent intrastate 7AJ Memorial V.h.f. Contest.

There was a good 2 mx break-through during Easter and quite a few new VK3s were worked. Seven VK7s were heard on that night. 73, Leigh Pretty.

NORTH-WEST ZONE

Sorry no notes last month chaps, but they must have been delayed in the mail. The same fate may befall these, what with a late meeting and a P.O. strike. I am keeping my fingers crossed.

Main news last month was the highly successful Field Day held at Port Sorell. The attendance was terrific, and all agreed that it had been a thoroughly enjoyable and interesting day. All thanks must go to organisers Basil 7BL and Max 7MX, also to all the Northern Zone people who helped to considerably swell the ranks.

Last meeting was held on the 7th and was well attended as usual. We were pleased to welcome several visitors, including former Southern Zoners Mike 7ZAV and Charlie 7CH, who are now living in Burnie.

There have been several good openings recently on 2 mx, particularly over the Easter break. Many VK3s were contacted, Kevin 7ZAH using only 5 watts.

Seems we are losing one of our newer, and keenest, Hams. Basil 7BL is departing for VE land in August. Best of luck, Basil. 73, 7ZBH.

HAMADS

Minimum 5/-, for thirty words. Extra words, 2d. each.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. Copy must be received at P.O. Box 36, East Melbourne, C.2, Vic., by 8th of the month, and remittance should accompany the advertisement. Call signs are now permitted in Hamads. Dealers' advertisements not accepted in this column.

COLLINS 32S1 S.s.b. Transmitter with 516F a.c. power supply, unused, £380. National HRO-60 Receiver, complete, as new, £325. Finance can be arranged. VK3TD, "Cheviot," Stephens Road, Mt. Eliza, Vic. Tel. 7-1407.

FOR SALE: English Minimitter Tx, all bands 80-10 metres, t.v.i. proof, 150w. c.w., 120w. a.m., good condition and performer, also home-made "Z" Match Antenna Coupler, with in-built S.w.r. Meter, £80, o.n.o. Home-made 120w. rack mounted Tx, 80-10 metres, pair 807s push-pull in final, modulator pair 807s zero bias, UM3 Modulation Trans., power trans., 1,000v. aside tapped at 750v. and 500v, Geloso and Command V.f.o's., easily converted to d.s.b., £25, o.n.o. Philips 2-inch C.r.o. with spare tube, £7/10/0. Give-away equipment to buyers of above. G. P. Butler (VK3GB), 70 May St., Nth. Fitzroy, Vic. Phone 48-2883.

FOR SALE: Kokusai Mechanical Filter, Type MF-455-10-K, bandwidth 2.1 Kc., c/w. circuit and all specifications, £10. A & R Filter Choke, 300 mA. swinging, 5/20 Henry, £2. VK-3AHT, Phone 314-6760 (Vic.).

FOR SALE: Heathkits—11 tube C.r.o. 5 Mc. bandwidth, Model 0-12; Audio Sine Wave-Square Wave Oscillator, 20 c.p.s.-1 Mc., Model AG-10; Sweep Generator, 5 Mc.-220 Mc; Audio Millivoltmeter, range 10 mV.-300 volts; Tube Checker and Case; Balun 75-300 ohm; Ham Band V.f.o. All complete and new. Best offer to VK3AMW, 23 Winters Way, Doncaster, Vic. or telephone 857-6482.

FOR SALE: Wagner Sideband Transceiver. Upper or Lower Sideband or break-in c.w. on all bands 80 through 10 mx. 2.1 kc. Mechanical Filter, built-in vox, p.t.t., Xtal Cal., S Meter, Linear Relay, etc. Separate V.f.o's with 1 kc. accuracy for transmit and receive. Complete with Speaker and a.c. power supply in matching cabinets, in as new condition, still under guarantee. £350 or offer. VK2DM, 40 Ware St., Fairfield, N.S.W. Phone 72-5601.

GELOSO G222-TR Transmitter, new condition, £85. Command Transmitter, 4-5.3 Mc., unmodified, £5/10/0. New Geloso 4/102 V.f.o., £6. H. Webber, VK3PW, Phone 50-6023.

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KWM2 Collins with power Pack 516F/2. Station control 312B/4. All in mint condition, with mains transformer, ready to plug in and go. Including a 3-band trapped dipole. Will sell separately. Norman Schroeder, Lot 1, Helene St., Eltham, Vic. Ph. 439-8142.

SELL: Command Rx Q5ers (incomplete), £5; 3-6, £10; 6-9, £7½; Tx 3-4, £6; 4-5.3 and 5.3-7, £5; TA12, £7½; MN26C with pwr. pack, £15. Pwr. and mod. trans., chokes, f. & v. capacitors, resistors, tubes, sockets and shields. Genemotors and shaded pole motors, many oddments. Syd. Clark, VK3ASC, Phone 45-3002 (Melb.).

SELL: Step-down Transformer 1 k.v.a. Primary 8 taps 180v. to 250v., Secondary 115v. Ideal for Collins transmitter or transceiver. 146a Cotham Rd., Kew, Vic. Phone 80-3777.

TYPE S Power Supply, good condition, 240 volt a.c. to 550 volts 200 mA., 300 volt 100 mA., 250 volt 80 mA., £8. ATR2B Transceiver and 240 volt a.c. supply, mod. for ship's frequency, 2.5 to 7 Mc., £15. ART13 Transmitter by Collins, good condition, all tubes, 2/811s mod., 813 final, complete with manual, £25. VK2AAK, Kulnura,. N.S.W.

WANTED TO SELL: Type 3 Mk. II. Transceiver with built-in modulator, speaker, netting switch, spare tubes, key, new crystal mike, instruction book, £25. Also W2EWL Phasing Type S.s.b. Transmitter, no power supply, £20. Other Ham gear. VK3AHG 29-7609 (Melb.).

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